

(No Model.)

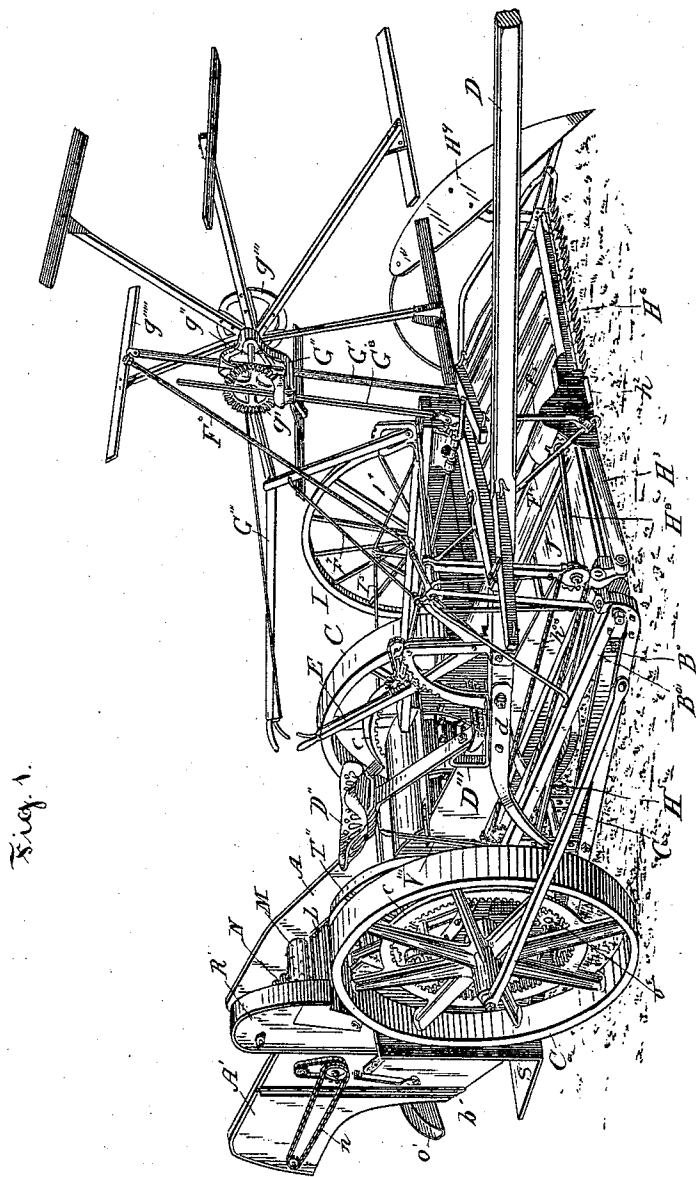
13 Sheets—Sheet 1.

J. S. McCORMICK.

COMBINED HARVESTER, THRESHER, AND SEPARATOR.

No. 581,219.

Patented Apr. 20, 1897.



Witnesses:

Chas. V. Calley.

W. Noffke.

John S. McCormick  
Inventor

by A. Harvey  
his Attorney.

J. S. McCORMICK.

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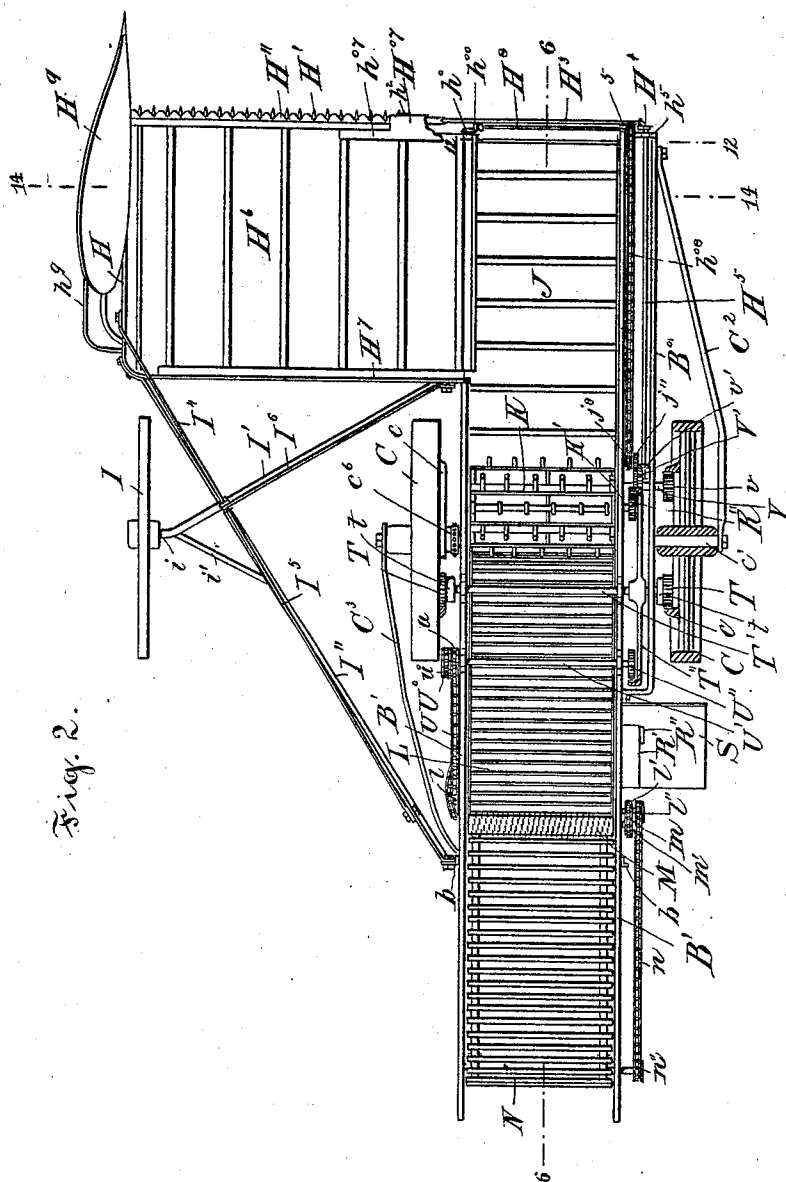


Fig. 2.

Witnesses:

Charles Riley.  
W. Noffke.

John S. McCormick  
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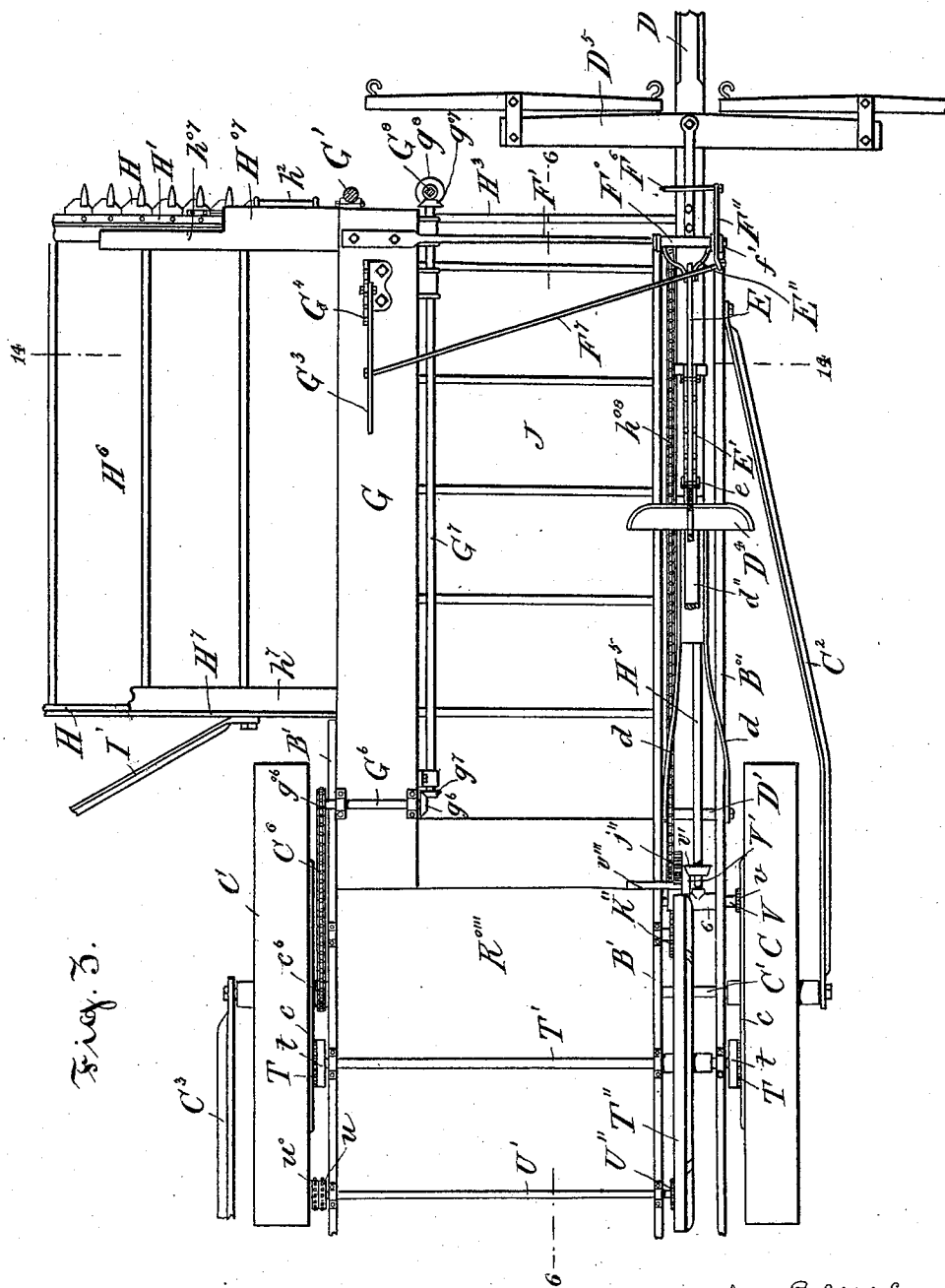


Fig. 3.

Witnesses:  
Chas. Raley.  
W. Moffke.

John S. McCormick  
Inventor  
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(No Model.)

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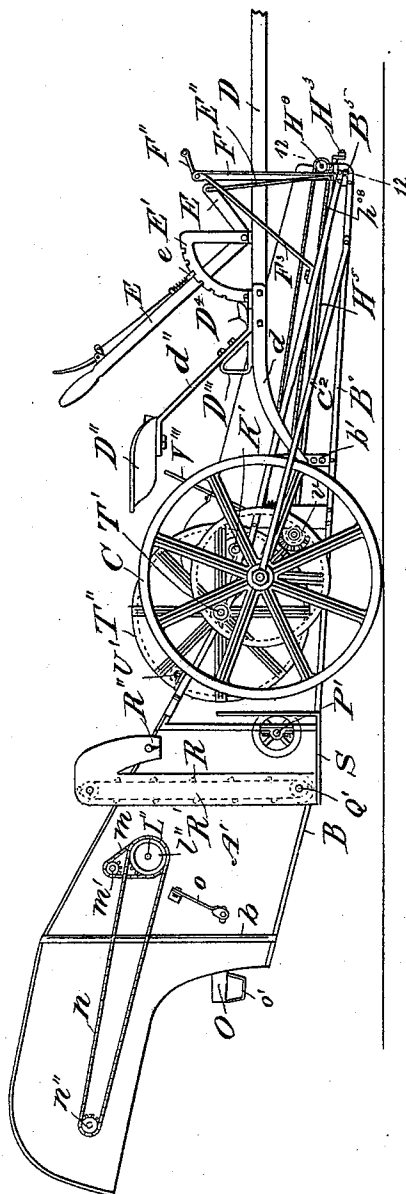
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Fig. 4.



Witnesses:

*Shas. Raley.*  
*W. Hoffke.*

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(No Model.)

13 Sheets—Sheet 5.

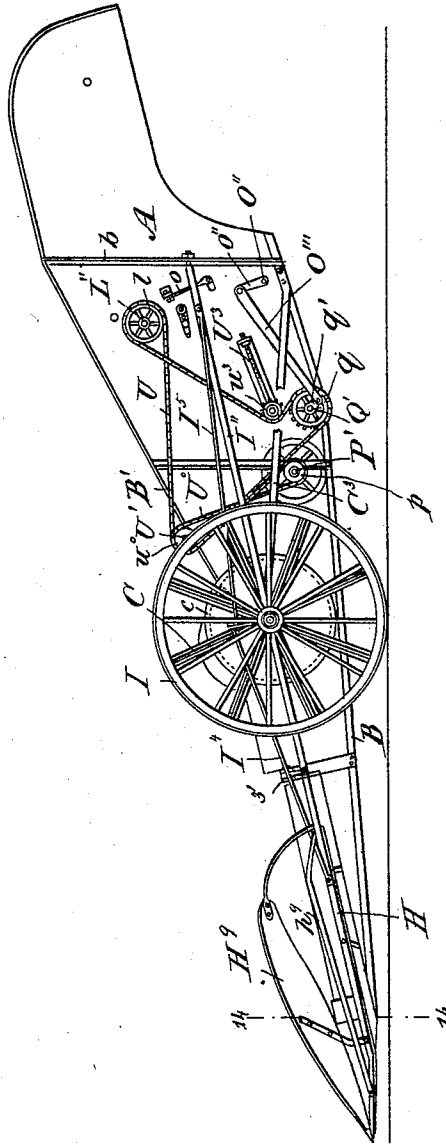
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Fig. 5.



Witnesses:

Chas. Raley.  
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(No Model.)

13 Sheets—Sheet 6.

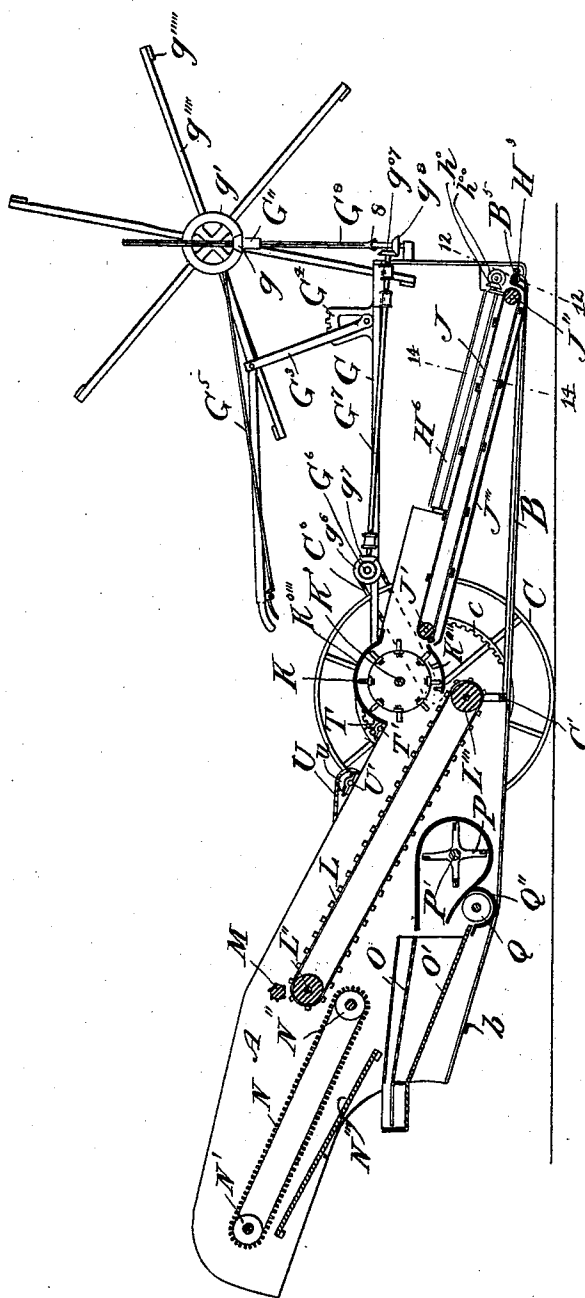
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Fig. 6.



Witnesses:

*Chas. Raley.*  
*W. Hoffke.*

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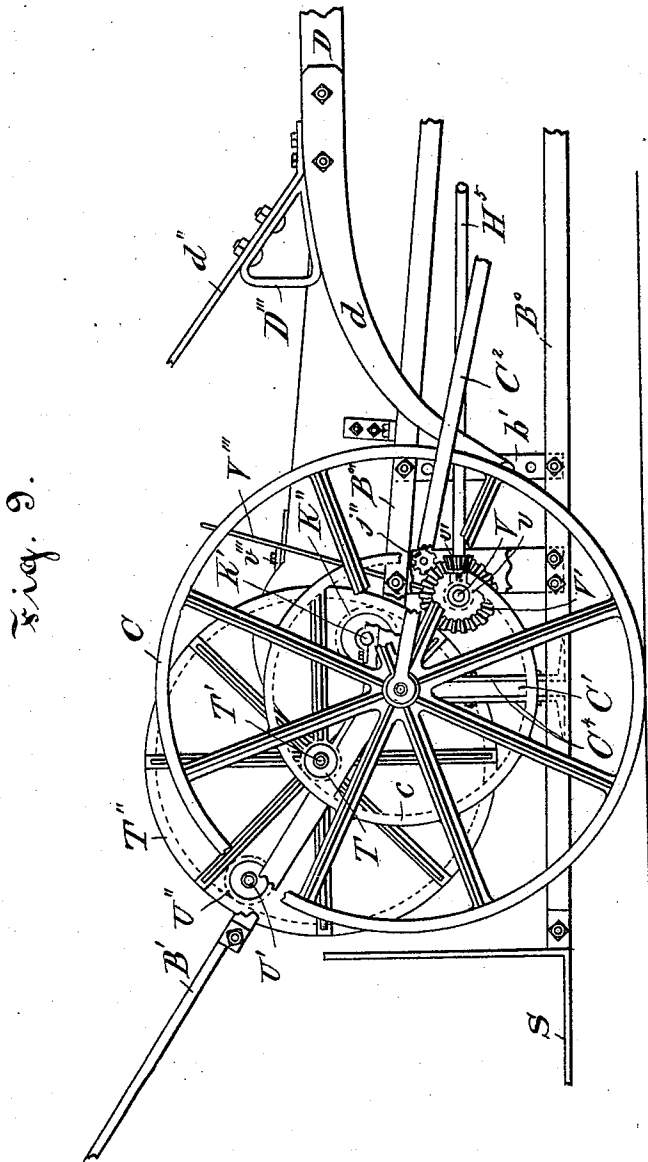


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Witnesses:

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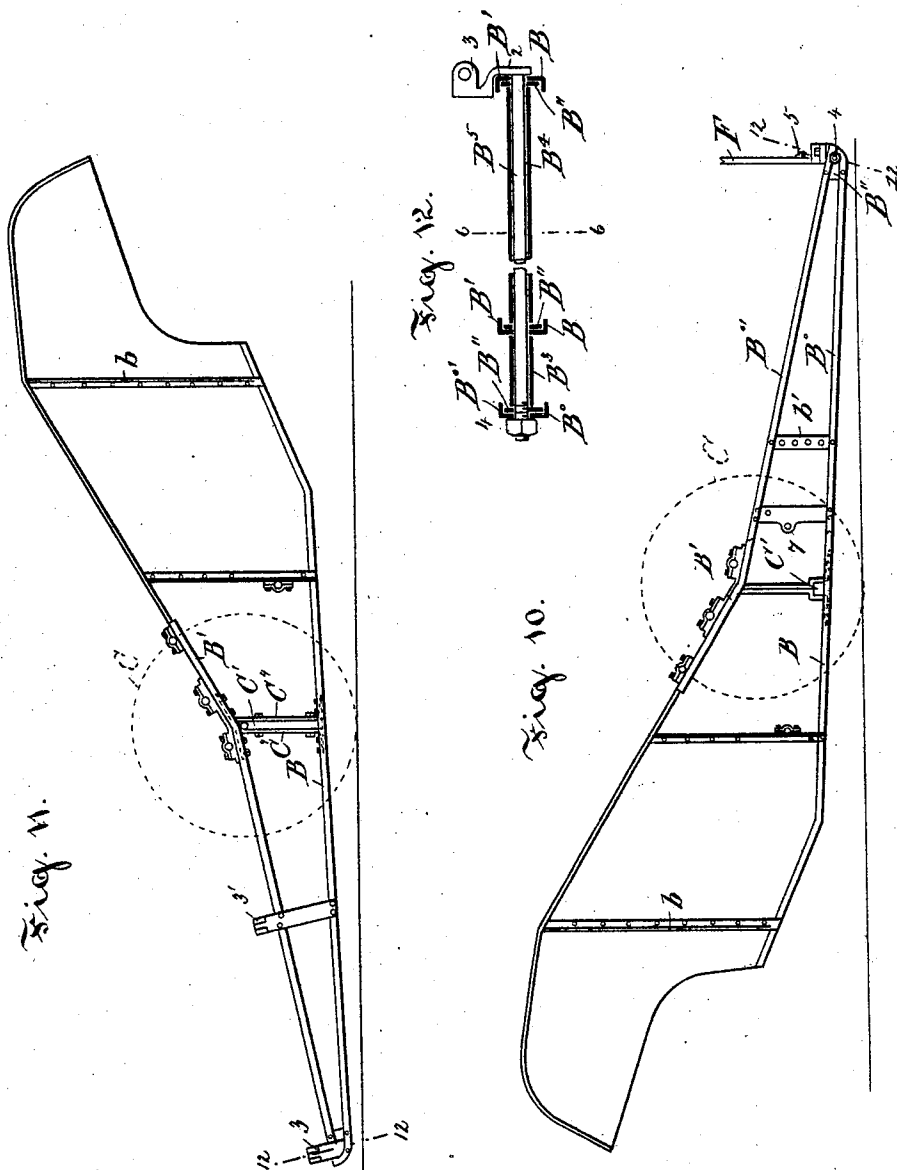
13 Sheets—Sheet 9.

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Witnesses:

Thos. Raley.  
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(No Model.)

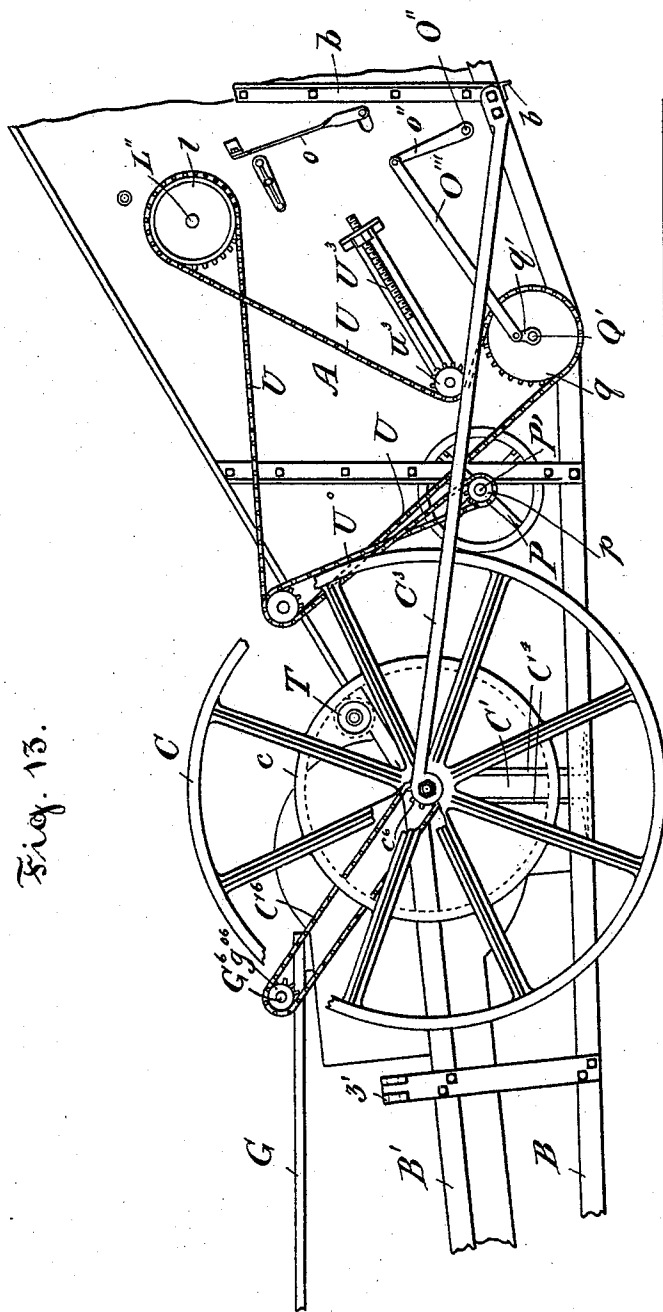
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No. 581,219.

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Sig. 13.

Witnesses:

Thos. Raley.  
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(No Model.)

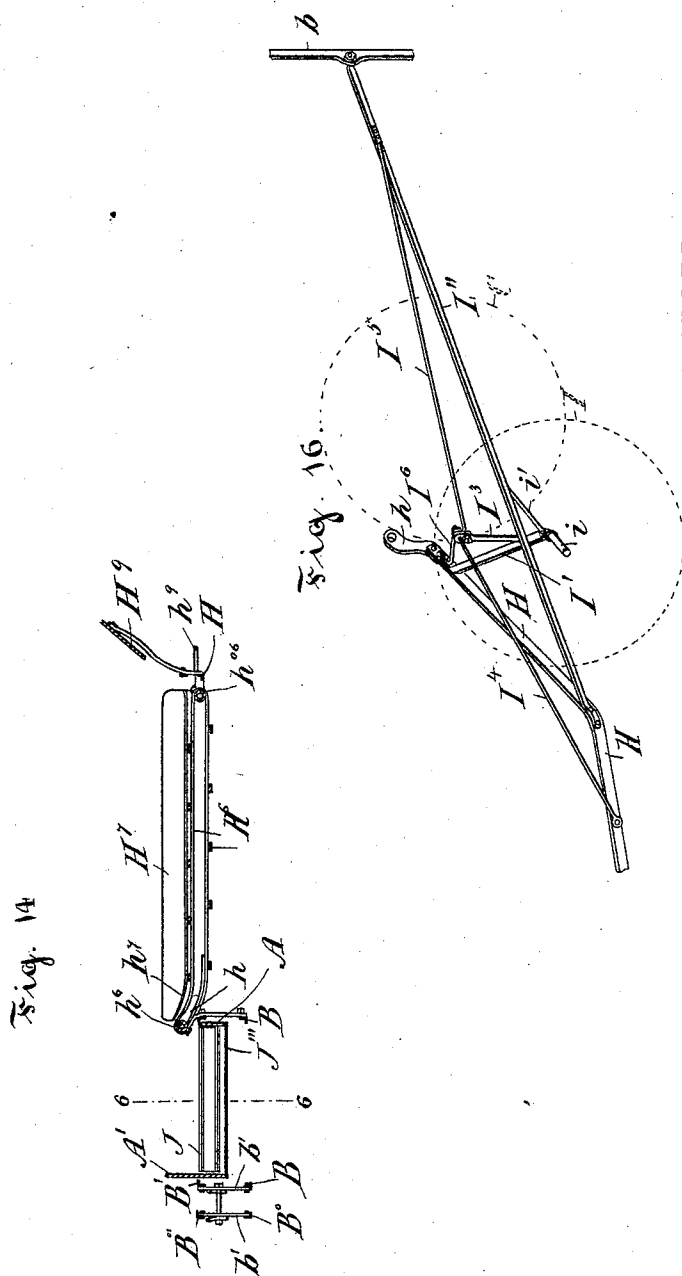
13. Sheets—Sheet 11.

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Witnesses:

Thos. Paley.  
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13 Sheets—Sheet 12.

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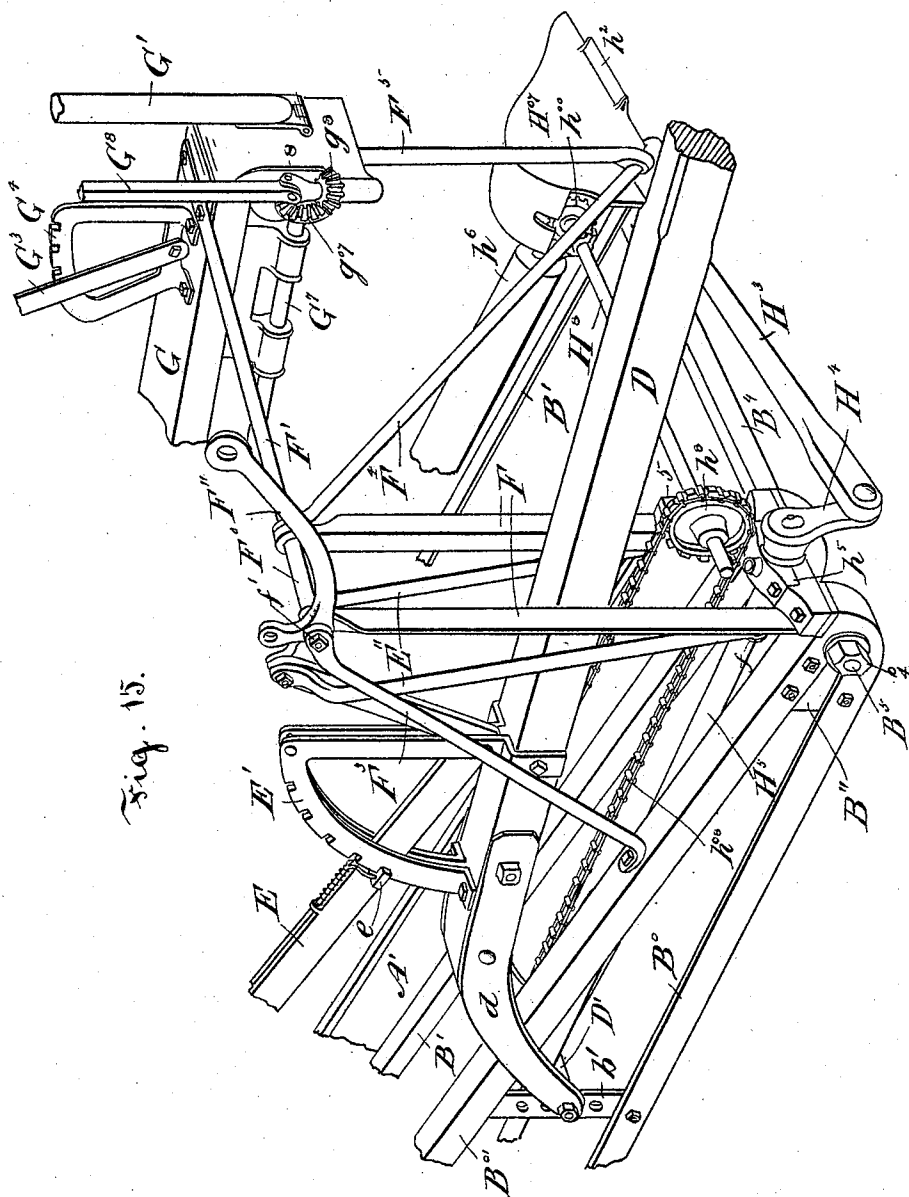


Fig. 15.

Witnesses:

Thos. Riley.  
W. Hoffke.

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J. S. McCORMICK.

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Fig. 17.

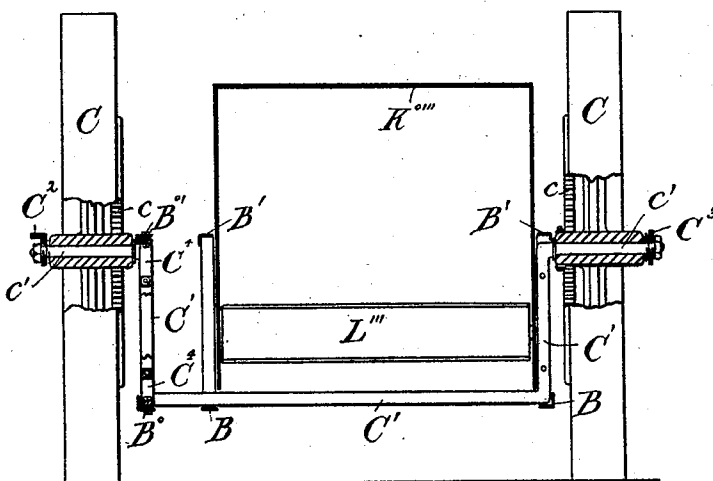


Fig. 18.

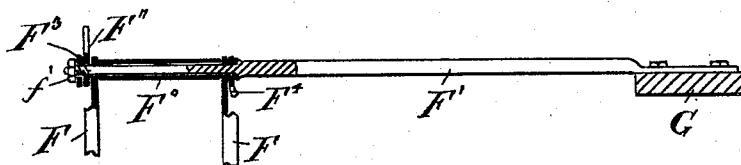
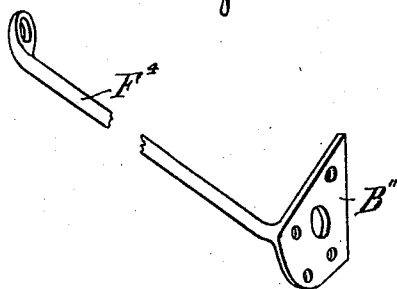


Fig. 19.



Witnesses:

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B. Harvey.

John S. McCormick  
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# UNITED STATES PATENT OFFICE.

JOHN S. McCORMICK, OF OTTAWA, CANADA, ASSIGNOR TO WILLIAM J. CONROY, OF AYLMER, AND ALEXANDER MACLAREN, OF BUCKINGHAM, CANADA.

## COMBINED HARVESTER, THRESHER, AND SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 581,219, dated April 20, 1897.

Application filed February 17, 1896. Serial No. 579,668. (No model.) Patented in Canada March 25, 1896, No. 51,762.

*To all whom it may concern:*

Be it known that I, JOHN S. McCORMICK, of the city of Ottawa, in the county of Carleton and Province of Ontario, in the Dominion of Canada, have invented certain new and useful Improvements in a Combined Harvester, Thresher, and Separator, (for which I have obtained a patent in Canada, No. 51,762, bearing date the 25th of March, 1896;) and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part hereof.

My invention, which will be hereinafter fully set forth and claimed, relates to a combined harvester, thresher, and separator.

The object of my invention is a machine which will cut low, harvest, thresh, and separate the grain all in one operation, leaving the clean grain ready bagged for carting off the field and dropping the straw as it passes along.

Figure 1 is a perspective view of my improved machine. Fig. 2 is a top view of the same, the reel and tongue being omitted and one of the main wheels being in section. Fig. 3 is a partial top view of the same, showing the tongue and reel attachment. Fig. 4 is a side elevation of the same, showing the stubble side. Fig. 5 is a side elevation of the other (grain) side of the same. Fig. 6 is a longitudinal section of the same on line 6 6, Figs. 2, 3, 12, and 14. Fig. 7 is a top view of part of the main gearing on a larger scale, the main wheel being in section. Fig. 8 is a transverse sectional elevation corresponding to Fig. 7. Fig. 9 is a side elevation of the main gear, corresponding to Figs. 4, 7, and 8. Fig. 10 is a side elevation corresponding to Fig. 4, showing the framework only. Fig. 11 is a side elevation corresponding to Fig. 5, showing the framework only. Fig. 12 is a vertical transverse section of the front of the frame on line 12 12, Figs. 2, 4, 6, 10, and 11. Fig. 13 is an elevation of the main gear, corresponding to Fig. 5, on a larger scale, and being the counterpart of Fig. 9. Fig. 14 is a transverse section of the cutting-table on line 14 14, Figs. 2, 3, 5, and 6. Fig. 15 is a detail of the tongue, adjusting-gear, reel-bracing,

&c., on a larger scale. Fig. 16 is a perspective view of the bracing of the outside or grain wheel and cutting-table, grain and main wheel shown dotted. Fig. 17 is a vertical transverse section through the center of the main wheels, showing the cranked axle in elevation and being at the rear of and somewhat similar to Fig. 8. Fig. 18 is a longitudinal section along the transverserod F', partly in elevation. Fig. 19 is a detail of the brace or tie rod F<sup>4</sup> with plate B."

The main frame (shown separate in Figs. 10 and 11) consists of two similar skeleton sides or frames having their rearward ends rigidly secured to the upright parts of rectangular angle-iron bails b, open at the top. These skeleton sides or frames consist each of two angle (or other rolled section) iron bars B B', one above the other, converging toward and meeting at the front ends, where they are joined so as to form a V-shaped structure, the lower one, B, being approximately parallel to the ground and both following at the rear the top and bottom edges of the side-boards A A'. These two main sides are supplemented on the left or stubble side, if the cutting-table is on the right or grain side, as shown, by another similar but shorter auxiliary frame B<sup>0</sup> B<sup>0'</sup> at a little distance from the other adjacent side and parallel to it, for the purpose of supporting some of the gearing, as seen in all the figures of the drawings, but particularly in the figures above referred to and in Figs. 12 and 14.

The lower bar B of each main side or frame forms the lower edge of the side-board A or A' and extends to its full length rearwardly. The other or upper, B', follows and lines the upper edge of the side-board, the latter being secured to said bars, brackets, or gussets supplementing the means of connection where required, and both the upper and lower bars of the main and auxiliary frames converging to a "point," so to say, in front, the two ends of each being there joined to a plate B'', as shown in Figs. 10, 11, and 12. Said plates are connected transversely by two tubular distance-pieces B<sup>3</sup> and B<sup>4</sup>, through which and the three plates passes a long bolt B<sup>5</sup>, provided with a collar and eyed lug 2 and 3 at one end (where

the table is hinged) and secured by a nut 4 at the other, as shown in Fig. 12. The rear ends of the bars of the outside or auxiliary frame B<sup>0</sup> B<sup>0'</sup> are bent to and joined and secured to their corresponding main bars rearward of the main gearing, as shown in Figs. 2 and 9, so as to support, partly, the overhanging gearing. The main frame thus constructed is adapted to carry and support the various gears, attachments, and mechanisms required in a combined harvester, thresher, and separator. Said main frame is supported upon a pair of broad-rimmed main and driving wheels C, journaled upon suitable trunnions secured to the main frame, or, as shown in Fig. 17, upon the arms c' of a crank-axle C', the ends of which are held in braces C<sup>2</sup> and C<sup>3</sup>, (shown in Figs. 1, 2, 4, 5, 7, 8, 9, and 13,) the axle being also shown in Figs. 10, 11, and 17, secured by a pair of brackets C<sup>4</sup> to the main frame. The position of this axle on the main frame is so chosen that the latter is as nearly as may be balanced thereon when the machine is fully equipped, with a slight tendency to tilt forward, of course. This is important in regulating the angle or inclination of the machine to the ground, or, what is the same thing, the height of the cutting-bar from the ground. This is effected by means of the tongue and a lever arrangement upon it which connects it with the main frame.

D is the tongue or pole. (Shown in Figs. 1, 3, 4, 9, and 15.) It is provided at the rear at each side with a downwardly-curved arm d, the outside one of which is also curved a little sidewise to pass outside the frame-bar B<sup>0'</sup> which it straddles, so that the tongue is over the main side frame and the arms d form a fork at opposite sides of the the bars B'. An eye is provided at the lower end of each of said arms, adapted to receive a transverse pin or bolt D', passing through two upright bars B', Fig. 10, secured to the frame-bars B B' and B<sup>0</sup> B<sup>0'</sup>, and perforated with a series of holes for the reception of said pin or bolt. In this manner the tongue is pivotally connected at the rear end to the main frame. The front end of the main frame is adjustably connected to the tongue by a bell-crank lever E, pivoted in a notched sector E', which is secured upon the tongue and provided with a spring-stop e. The short or lower leg (bell-crank end) of the lever has pivoted to it a yoke-link E'', straddling the tongue, and the lower ends of which are pivoted in turn to the frame, or speaking more specifically, to the lower ends of the upright posts F, which are rigidly secured to the main frame and form part of the bracing arrangement of the front of the machine. Upon the rear end of the tongue is also secured the driver's seat D'', held on a standard d'', which is bolted to the tongue and supported by a bracket D''', as shown in Figs. 3, 4, and 9. D<sup>4</sup> is the foot-board, also secured upon the tongue. The lever E is thus in front of the driver's seat and readily accessible from the seat.

It will be seen that by disengaging the spring-stop e and drawing the lever either backward or forward the front of the main frame will be brought nearly to or farther from the tongue, the latter being supposed to be carried by the horses at a uniform height. Lateral rigidity of the connection between the tongue and frame is obtained by the spreading legs of the yoke E'' and arms d. To the tongue is also secured, of course, the doubletree D<sup>5</sup> with singletrees in the usual manner.

The posts F (shown in Figs. 1, 3, 4, and 15) have their lower ends rigidly secured to the front end of the upper angle-bars B' and B<sup>0'</sup> and their upper ends, formed with eyed hubs, connected by a shouldered transverse rod F' with tubular sleeve or distance-piece F<sup>0</sup> into a rigid structure, as shown in Fig. 18. A hubbed double arm F'' is also held rigidly on the same rod, together with the upper end of a brace F<sup>3</sup>, the hubs of the outer post F, arm F'', and brace F<sup>3</sup> being jammed against the shoulder of the rod F' by a nut f'' on the end of said rod, the tubular sleeve intervening between the hubs of the posts. The lower end of the brace F<sup>3</sup> is secured upon the upper and outer frame-bar B<sup>0'</sup>, the brace taking a slanting position. The inner end of the rod F' is secured to the platform G, which supports the reel and its gearing, acting as a stay. Another brace or tie rod F<sup>4</sup>, rigidly secured upon the rod F' between the shoulder of the latter and the hub of the inner post F, slants down and engages the forward end of the outer or near frame-bars B B' by having the plate B'' forged at the end, as shown in Fig. 19, and from the lower end of said tie-rod rises the strut F<sup>5</sup>, which supports the front end of the platform G. Near the lower ends of the posts F are the lugs f, to which the lower ends of the yoke E'' are pivoted. Guy-rods F<sup>6</sup> and F<sup>7</sup> are secured to the ends of the double arm F'' to hold the reel-post and lever, the length and position of the arms having the object to bring the base of the rods in line with the center of the movement. It will thus be noticed that the posts F and brace F<sup>3</sup> with part of the rod F' acts much like a truss over the point of support of the main frame to help carry the free end and keep the frame from warping.

The reel is the ordinary one as used on binders, and, being shown in Figs. 1 and 6 and partly in Figs. 3 and 15, needs no particular description. It consists of the post G', hinged to the front of the platform G and guyed at the top by the rod F<sup>6</sup>. Upon this slides a frame G'', carrying the bevel-gears g g', axle g'', and spider g''', the latter the arms g'''' and these the cross-piece g'''''. The position or inclination of the post G' forward is controlled by a lever G<sup>2</sup>, pivoted in a slot in the notched sector G<sup>4</sup> on the platform G and guyed laterally by the rod F<sup>7</sup>. The same lever also controls the elevation of the framework, which is pivoted to its double arms g<sup>3</sup>,

together with a spring-pin engaging a series of perforations in the post  $G'$  and operated by a draw-rod  $G^5$ , supported on the said lever.

The platform  $G$  is supported in front by the 5 strut  $F^5$ , referred to above, and its rear is secured upon the casing of the cylinder  $K^{0''}$ , being placed nearly above the grainward frame  $B B'$ . (Shown in top view in Fig. 3.) Said platform also carries the gearing for the 10 reel, consisting of a small cross-shaft  $G^6$  with sprocket-wheel  $g^{06}$  and a bevel-wheel  $g^6$  at the other end. This gears into the bevel-wheel  $g^7$  on a longitudinal shaft  $G^7$ , having a bevel-wheel  $g^{07}$ , which gears into a bevel-wheel  $g^8$ , 15 fast on the upright square shaft  $G^8$ . The lower end of the latter is suitably journaled and provided with a universal joint 8, Figs. 1, 6, and 8, above the wheel, while the upper part of said shaft is passing freely through 20 the square eye of the bevel-pinion  $g$ , journaled in the frame  $G''$ , Figs. 1 and 6. The universal joint 8 allows the square driving-shaft  $G^8$  to follow the inclination of the reel-post  $G'$ .

The cutting-table, Figs. 1, 2, 3, 5, and 14, 25 consists of the frame  $H$ , of angle or channel iron, resembling generally the construction of the cutting-table now in ordinary use, but the frame may be open—*i. e.*, unconnected—at the hinged end. At the front edge it is 30 provided with the finger-bar  $H'$ , in which runs the knife  $H''$ . The latter is receiving motion through the pitman  $H^3$  and crank  $H^4$  on the longitudinal shaft  $H^5$ , which is placed between the stubble-side frames  $B B'$  and  $B^0 B^{0'}$ , being 35 journaled in a bearing  $h^5$ , secured upon the front end of the side frames, as seen in Fig. 15. The front edge of the table is approximately in line with the front of the main frame, but its hinged end is curved up and 40 raised above the upper frame-bar  $B'$ , to and above which it is hinged, as shown in Fig. 14. The eyed lug 3 on the bolt  $B^5$ , above referred to, and seen in Figs. 11 and 12 bent up and over the top of the bar  $B'$ , forms part of one 45 of the hinge-joints. Another,  $3'$ , is secured to the same bar at the rear end of the frame  $H$ , as shown in Fig. 11. Brackets  $h$ , secured to the ends of the frame  $H$ , bent up and provided with an eye, or the ends of the bars of the 50 frame  $H$  themselves suitably bent and provided with an eye, form the other part of the hinge-joint, with the shaft of the apron-roller  $h^6$  running through them and acting as a hinge-pin. Another roller  $h^{06}$  is journaled at 55 the other end of the frame  $H$ , and over this runs the slatted carrier-apron  $H^6$ , its upper surface approximately level with the front edge of the table, but its delivery end raised, the line of the apron being maintained at the 60 back by a guide-plate  $h^7$ , placed against the backboard  $H^7$  and overlapping the ends of the slats, and at the front by the top of an extended portion  $h^{07}$  of a casing  $H^{07}$ , which covers the gearing for the apron-roller and 65 the connection of the knife  $H''$  and pitman  $H^3$  with the knife-guide  $h^2$ , and which is secured to the frame  $H$ . Upon the front end

of the apron-roller  $h^6$  is a bevel-wheel  $h^0$ , Figs. 2 and 6, gearing into a bevel-wheel  $h^{00}$  on a cross-shaft  $H^8$ . (Also shown in Figs. 4 and 70 15.) This is journaled in a bearing secured to the frame-bar  $B'$  at one end, at the other to the inner post  $F$  by a bearing 5, Fig. 15, and carries a sprocket-wheel  $h^8$ , driven by a chain  $h^{08}$ , passing between the two posts  $F$ . 75 At the outside or near the end of the table is the usual divider  $H^9 h^9$ .

The outside, grain side, or free end of the table is supported by the grain-wheel  $I$ , the axle of which carries suitable trusswork rigidly 80 connected to the frame of the table and hinged to the main frame of the machine, as shown in Figs. 2, 5, and 16. An axle  $I'$  is bent at the rear of the arm  $i$ , which is in line with the main axle  $C'$  and secured to the rear bar 85 of the table-frame  $H$  near its junction with the frame  $B B'$ . It is supported by an angle-bar bearer  $I''$ , which is rigidly secured to the corner of the frame  $H$  at one end and pivoted to the frame-bail  $b$  at the other. This is 90 trussed by a strut  $I^3$  over the axle, from the top of which extend three tie-rods  $I^4$ ,  $I^5$ , and  $I^6$ , one secured to the outer bar of the frame  $H$  at a point forward of the point of attachment of the bearer  $I''$ , the other to the bearer 95  $I''$  near its pivotal support, and the third to the axletree near its point of support, this one being shorter and acting as a stay and their connection with the strut being adjustable. A brace  $i'$  extends from the point of the axletree 100 to the bearer  $I''$  rearwardly in an angular direction. This trusswork, it will be seen, has only one point of support with the main frame  $B B' b$ , and that is made pivotal. With the table-frame  $H$  it is rigidly connected at 105 three points, while the bearer  $I''$ , which is the support of the axle  $I'$ , is made rigid by trussing. The wheel  $I$  is thus at the rear of the outer end of the table  $H$  and will carry the free end of the table at a uniform height 110 from the ground independent of the main wheels  $C$ .

So far the description refers to the framework and the cutting apparatus with reel and 115 its gear.

The carrier-apron  $H^6$  from its elevated delivery end drops the cut grain upon another slatted endless apron  $J$ , sometimes called the "elevator," which moves at a right angle to the carrier  $H^6$  and delivers it into the concave 120  $K^{0''}$ , in which is the cylinder  $K$ , covered by the casing  $K^{0''}$ . (Shown particularly in Fig. 6, but also in Figs. 1, 2, and 3.) The apron  $J$  runs over two rollers  $J'$  and  $J''$ , the upper one, also shown in Figs. 7 and 8, being the 125 driven one and placed close to the concave, the upper surface of the apron being about level with and parallel to the upper frame-bars  $B' B^{0'}$ , the rollers being journaled in brackets secured to them. Below the lower 130 run of the apron is placed a sheet  $J'''$ , forming a bottom extending to the concave. The sides  $A A'$  extend forward to this portion to form the channel.

The following with the concave and cylinder K forms part of an ordinary thresher. A closely-slatted apron L is placed at a suitable angle and runs over rollers L'' and L''', the upper one of which is the driven one and the lower one placed under the concave K''', being journaled in suitable bearings secured to the sides A A'. This apron receives the produce of the cylinder—grain, straw, and chaff—from the cylinder and elevates it upon the straw-carrier N, the straw being elevated by a shaker, beater, or kicker M, placed over the upper roller L'' and driven from it. The straw-carrier N, consisting of slats with fabric, runs over two rollers N' N'', the upper one of which is the driven one. It carries the straw over the top roller and drops it. The small stuff will pass between the slats and drop upon the upper sieve or screen of the cleaning apparatus, the portion that has been carried part of the way up being caught and guided down by the inclined bottom N<sup>3</sup>. The air-blast from the fan P passes between the sieves O, hung on the springs o and the sloping bottom O', and blows out the chaff and other light impurities at the rear by the spout o'. The clean grain arriving at the bottom of the incline O' is collected in the casing or trough Q'' of the conveyer Q at the lower end of it and is conveyed to one side by said conveyer into a pocket, whence it is lifted by an elevator R, Fig. 4, operating in a casing R' into a delivery-spout R'', to which a bag may be attached to receive it. A platform S is provided under said spout, on which the bag may rest and on which a person may step when removing the bag.

The various motions are derived as follows, and are principally shown in Figs. 3, 7, 8, 9, and 13: Each of the main or driving wheels C has on its inner side an internal spur-rim c, which gears into a pinion T. These pinions are secured upon the ends of a cross-shaft T' by a ratchet-box t, Fig. 2, so that the shaft T' will be turned by any one or both of the wheels C and pinions T, but will allow any one of the wheels C to stand still or turn backward without interfering with the motion derived from the other. The shaft T' is journaled upon the upper frame-bars B', being the top of the sides A, and carries at one end an internal spur-wheel T''. In this are geared two pinions U'' and K'', the one fast upon a cross-shaft U' and the other upon the shaft K' of the cylinder K, which latter thus derives its motion. The cross-shaft U' is also journaled upon the upper frame-bars B' rearward of the shaft T', carrying at the grainward end two sprocket-wheels u and u', from which chains U and U<sup>0</sup> drive the apron L, conveyer Q, vibrator O'', and fan P, as shown in Fig. 13. For this purpose the apron-roller shaft L'' is provided with a sprocket-wheel l and the shaft Q' of the conveyer with a sprocket-wheel q, the chain U being crossed on the wheel l and running over a tightening-pulley u<sup>3</sup>, journaled in a tightening device U<sup>3</sup>.

The chain U<sup>0</sup> over the sprocket-wheel u<sup>0</sup> runs crossed over a sprocket-wheel p on the fan-spindle P'. The conveyer-shaft Q' is provided with a crank q', which operates a pitman O''' on an arm o'', the latter being fast on the vibrator-axle O'', which operates the sieves O. The conveyer-shaft Q' is also provided with a sprocket-wheel at the other end, over which the elevator R runs. The apron-shaft L'' drives the straw-shaker M by a chain m and pair of sprockets l' and m' and also the upper apron N by a chain n and sprockets l'' and n''. (Shown in Figs. 1, 2, and 4.)

A sprocket-wheel c<sup>6</sup> on the hub of the grainward driving-wheel C operates the sprocket-wheel g<sup>6</sup> and the shaft G<sup>6</sup> by a chain C<sup>6</sup>. (See Figs. 3 and 13.)

Figs. 3, 7, 8, and 9 show the gearing, from which the elevator J, the carrier H<sup>6</sup>, and the cutting apparatus derive their motion. A short cross-shaft V is journaled in bearings 6 and 7, held on brackets secured to the frame-bars B<sup>0</sup> B'' and B B', the principal bearing 6 being supported on the outer or auxiliary frame centrally on said shaft. It carries at its outer end a spur-pinion v, which gears into the internal spur-wheel c on the driving-wheel C at the stubble side; also, near its inner end a combined bevel and spur wheel V', which is loose on the shaft and connected to it by a clutch-box V'', pressed into gear by a spring v'', coiled upon the shaft and disengaged by a lever V''', pivoted on a cross-piece b'', secured to the upper frame-bars B' B'' and held in a stop v'''. Into the spur-rim of the wheel V' gears a spur-pinion j'' on the upper roller J'' of the apron J, the shaft V being so disposed on the framework and with regard to the wheel c and pinion v as to be adjacent to the center of the said roller. On the shaft of the latter is also a sprocket-wheel j<sup>8</sup>, over which runs the chain h<sup>8</sup>, above referred to, and which gives motion to the carrier H<sup>6</sup> by the shaft H<sup>3</sup> and sprocket h<sup>8</sup>.

The journal-bearing 6, holding the cross-shaft V centrally, combines with it another bearing 6' at a right angle, in which is journaled the end of the longitudinal shaft H<sup>5</sup> above described. Upon it is fast a bevel-wheel v', which gears into the bevel-rim of the wheel V', from which said shaft derives its motion for the reciprocating knife H<sup>2</sup>, transmitted through the pitman H<sup>3</sup> and crank H<sup>4</sup>. It will thus be seen that the clutch V'' may be disengaged by pushing out the lever V''' and allowing the wheel V' to run loose upon the shaft V. This stops the motion of the roller J'' and elevator J; also, the chain h<sup>8</sup> and with it the shaft H<sup>3</sup> and carrier-apron H<sup>6</sup>, likewise the shaft H<sup>5</sup> and with it the knife H<sup>2</sup>.

The working and principal features of the machine already enumerated in the description of the various parts may be briefly recapitulated as follows: The driving-power for the different moving parts is derived from the main or driving wheels C, the motion for the

reel exclusively from the grain-side wheel by the sprocket-wheel  $c^6$  and chain  $C^6$ , that for the carrier and elevator-aprons  $H^6$  and  $J$  and the cutting apparatus exclusively from the stubble-side wheel, while the motion of the cylinder  $K$ , aprons  $L$  and  $N$ , shaker  $M$ , sieves  $O$ , conveyer  $Q$ , elevator  $R$ , and fan  $P$  independently or collectively from both driving-wheels through the internal wheels  $c$ , pinions  $T$ , shaft  $T'$ , internal wheel  $T''$ , pinions  $U''$  and  $K''$ , and cross-shaft  $U'$ . The ratchet-boxes  $t$  upon the shaft  $T'$  allow one of the main wheels to stand still or turn backward without interfering with the motion given by the other. The grain side or free end of the cutting-table  $H$ , hinged at its inner end of the main frame, is carried independently at a uniform elevation above the ground by the grain-wheel  $I$ , being braced by the truss  $I''$ ,  $I^3$ ,  $I^4$ ,  $I^5$ , and  $I^6$ , rigidly connected to the table and hinged to the main frame.

The front of the main frame and cutting-line of the table are adjustably held at any desired elevation from the ground by having a lever connection  $E$ , sector  $E'$ , spring-stop  $e$ , and yoke  $E''$ , controlled from the driver's seat, and its working made possible by the machine being balanced upon its axle or pivotal support. This enables the straw to be cut high or low by instant adjustment. The height and position of the reel are also controlled from the driver's seat in the usual way, proper braces being provided on the posts  $F$  and its connections.

The grain being cut by the knife  $H''$  in the finger-bar  $H'$  is laid on the carrier  $H^6$  by the reel  $g'''' g''''$ . The carrier carries it to and drops it upon the elevator  $J$ , and this conveys it to the cylinder  $K$  in the concave  $K''$ , where the grain is separated from the straw. The cylinder delivers the whole produce upon the apron  $L$ , at the upper end of which the shaker  $M$  shakes and lifts over the straw on the open-lattice apron  $N$ , which drops it over its upper end, the smaller stuff dropping on said lattice direct and through it upon the vibrated sieves  $O$ , where it is fanned by the fan  $P$ , drawn to one side by the conveyer  $Q$ , and elevated and bagged by the elevator  $R$ .

I claim as my invention—

1. In a combined harvester and thresher, the combination of V-shaped skeleton sides connected by transverse bails at its wide or open ends and a similar but shorter outer frame parallel to it and having its open ends bent and connected to the adjacent frame and adapted to support the gearing and the front or point of the frames connected by a transverse bolt and distance-pieces, main or driving wheels journaled to said frame by suitable means such as trunnions or an axle in such a position as to balance the frames with its equipment upon said wheels, a pair of upright perforated bars secured to the converging part of the auxiliary-frame side and adjacent main-frame side some distance from the front or points, a tongue above said

main-frame side having a forked and bent-down rear end straddling said frame sides and pivoted to the said upright bars by a bolt or pin passing through said bars and forks, substantially as set forth.

2. In a combined harvester and thresher, the combination of a frame consisting of three V-shaped skeleton sides having their bars inclined so that the lower limbs are approximately parallel to the ground and said sides suitably connected transversely, main or driving wheels supporting said frame by suitable means such as trunnions or axle and so as to be approximately balanced when equipped, a tongue above the middle-frame side having a forked end pivotally secured to perforated connecting-pieces on the converging parts on the middle and auxiliary frame sides by a transverse bolt or pin, a notched sector secured upon said tongue, a bell-cranked hand-lever pivoted in said sector and provided with a spring-stop engaging its notches and a yoke-link pivoted to the bell-crank end of the lever straddling the tongue and to the points or front ends of the stubbleward sides of the main frame, substantially as set forth.

3. In a combined harvester and thresher, the combination of a frame consisting of three V-shaped skeleton sides rigidly connected transversely and one being a shorter auxiliary one a short distance from the adjacent main side, main or driving wheels supporting said frame by suitable means such as trunnions or axle placed at such a point as to balance the frame with its equipment, a tongue pivotally connected to the auxiliary and adjacent main side, an adjustable bell-crank lever pivoted upon said tongue, a yoke-link pivoted to said bell-crank and to the lower ends of posts and straddling said tongue, posts rigidly secured to the front of the auxiliary and adjacent main-frame side and having the lower ends of the yoke-link pivoted to them, a transverse rod with shoulder and tubular distance-piece connecting the upper ends of said posts rigidly and extending laterally to the reel-platform, a brace secured to the upper bar of the auxiliary frame and connected to the transverse rod, a double arm secured to the end of said transverse rod adapted to hold guy-rods for the reel-post and reel-adjusting lever, a brace or tie rod extending from said transverse rod to the front of the outer main-frame side and supporting its front end, a strut secured to the lower end of said brace or tie rod and supporting the front of the reel-platform, the reel-platform supported by said strut and held by the said transverse rod in front and supported upon a cross-piece upon the main frame at the rear, a rod or post hinged to the front of said platform adapted to tilt forward, a guy-rod secured to the top of said post and to a branch of the double arm on the transverse rod referred to, a sliding frame on said post, a lever pivoted to said platform engaging said slid-

ing frame and a guy-rod connected to said lever and to a branch of the double arm above referred to, substantially as set forth.

4. In a combined harvester and thresher, the combination of a frame consisting of three V-shaped skeleton sides rigidly connected transversely and one being a shorter auxiliary one a short distance from the adjacent main side, upright posts F rigidly secured to the front ends of the auxiliary and adjacent main frame sides, a transverse rod F' connecting the upper ends of said posts and extending laterally to hold the reel-platform, a double arm F'' on said transverse rod, a brace F''' on said transverse rod and secured upon the upper bar of the auxiliary-frame side, a distance-piece on said transverse rod between said posts, a brace or tie rod F<sup>1</sup> extending from said transverse rod to the outer main frame side and supporting its front end, a strut F<sup>5</sup> secured to the lower end of the tie-rod F<sup>1</sup> and supporting the end of the reel-platform and the reel-platform G supported upon said strut at one end and upon a cross-piece secured to the main frame at the rear end, substantially as set forth.

5. In a combined harvester and thresher, the combination of a frame composed of transversely-connected sides each consisting of an approximately horizontal lower and forwardly converging and meeting upper bar, a table hinged at one end to the forward part of the said upper bar of one of said sides and parallel thereto and so as to project laterally, said table consisting of a frame adapted to carry the cutting and carrying apparatus, a bearer rigidly secured to the free end of said table and pivoted to the rear end of the main frame, a truss or tie rod secured to the pivot end of said bearer and to the free end of said table at a point forward of the point of attachment of the bearer, a strut supporting said truss-rod upon said bearer, and an angularly-disposed axle secured at one end to the rear end of the table and near the other below the strut to the bearer and having its arm bent to be at a right angle to the main frame, a stay-rod secured to the said strut and to the fixed end of said axle, a grain-wheel on the arm of said axle and a pair of main or driving wheels in line with said grain-wheel supporting the main frame at a point balancing the same with its equipment, substantially as set forth.

6. In a combined harvester and thresher, the combination of a frame composed of transversely-connected sides each consisting of an approximately horizontal lower and forwardly converging and meeting upper bar, a table hinged laterally to the forward part of said main frame, a bearer I'' secured rigidly to the rear angle of the table at one end and pivoted to the rear end of the main frame at the other, an angularly-disposed axle I' having its end secured to the rear bar of the table near its hinged end and near the arm to the bearer and having its arm i bent to be at a right angle to the main frame, a strut I<sup>3</sup> above said

axle upon said bearer, tie-rods I<sup>4</sup> and I<sup>5</sup> secured to the upper end of said strut and respectively to the outer frame-bar of the table forward of the point of attachment of the bearer I'' and to the latter near its pivoted end and a stay-rod I' connecting the fixed end of the axle with the top of the strut, substantially as set forth.

7. In a combined harvester and thresher, the combination of a frame composed of transversely-connected sides each consisting of an approximately horizontal lower and a forward converging and meeting upper bar, a table hinged laterally to the forward part of said main frame by means of lugs secured to and projecting above the upper bar of the main frame and upwardly-bent ends or brackets on the table-frame, an apron-roller the axle of which forms the hinge-pin, another apron-roller journaled at the other end of and lower in the frame of the table, a slatted carrier-apron running over said rollers approximately level with the front edge of the table except at the delivery end, guides at the rear and front of the frame maintaining the level of the apron, an elevator-apron in the channel formed by the frame sides and parallel with the upper bars of the same and running upon rollers journaled transversely in said channel and so that the upper surface of said apron is approximately level with the upper frame-bar, a sprocket-wheel on the axle of the upper roller of said apron and said axle adapted to receive motion, a cross-shaft at the front end of the main frame carrying a sprocket-wheel and connected to the sprocket-wheel on the roller-axle by a chain, and bevel-wheels on said shaft and the inner roller on the table, substantially as set forth.

8. In a combined harvester and thresher, the combination of a frame consisting of three V-shaped skeleton sides rigidly connected transversely at the front or point by a bolt and tubular distance-piece and at the rear two of them by transverse bails open at the top and the outside short or auxiliary one having bent ends secured to the adjacent main frame, main or driving wheels supporting said axle placed at such a point that the frame with its equipment is balanced thereon, an internal spur-rim on the inner side of the driving-wheel adjacent to the auxiliary frame side, a short cross-shaft carried in journals supported on one of the main-frame sides and the adjacent outer or auxiliary one, a pinion on said shaft gearing in said internal rim, a combined spur and bevel wheel loose on said shaft, a clutch-box on said shaft and wheel adapted to connect shaft and wheel, a lever pivoted on a cross-bar connected to the frame controlling said clutch-box, a spring on said shaft pressing said clutch-box into engagement, an elevator-apron in the channel formed by the side-boards of the main frame, transverse rollers journaled in said frame sides upon which said apron runs and a spur-pin-

ion on the axle of the upper apron-roller gearing in the spur-rim of said combined spur and bevel wheel, substantially as set forth.

9. In a combined harvester and thresher, the combination of a frame consisting of three V-shaped skeleton sides rigidly connected transversely, main or driving wheels supporting said arm by suitable means such as trunnions or axle placed at such a point that the frame with its equipment is balanced thereon, an internal spur-rim on the inner side of the driving-wheel adjacent to the outer or auxiliary frame side, a short cross-shaft journaled centrally in a bearing carried by the outer or auxiliary frame side and another bearing on the adjacent main-frame side, a pinion on the outer end of said shaft gearing into said internal rim, a combined spur and bevel wheel loose on said shaft, a clutch-box on said shaft and wheel adapted to connect shaft and wheel, a lever pivoted on a cross-bar connected to the frame controlling said clutch-box, a spring on said shaft pressing said clutch-box into engagement, a longitudinal shaft having one end journaled in a bearing forming part of the principal bearing of said cross-shaft and the other in a bearing secured upon the front ends of the main-frame side and the adjacent auxiliary one, a bevel-wheel on said shaft gearing into the bevel-rim of said combined spur and bevel wheel, a crank at the projecting front end of said shaft, a pitman pivoted to said crank, a knife connected to said pitman and a cutting-table hinged laterally to the main frame and carrying at its front edge a finger-bar in which said knife slides, substantially as set forth.

10. In a combined harvester and thresher, the combination of a frame consisting of three V-shaped skeleton sides rigidly connected

transversely and one being a shorter auxiliary one a short distance from the adjacent main side, main or driving wheels C supporting said frame by suitable means such as trunnions or axle placed at such a point as to balance the frame with its equipment, an internal spur-rim c on the driving-wheel adjacent to the auxiliary-frame side, a journal-bearing 6 6' carried on the auxiliary frame and adapted to carry the central part of a cross-shaft and the end of a longitudinal shaft, a secondary bearing 7 on the main frame, a short cross-shaft V journaled in said bearings, a spur-pinion v at the outer end of said shaft gearing in the internal spur-rim c, a combined spur and bevel wheel V' loose on said shaft, a clutch-box V'' on said shaft adapted to engage said combined wheel, a spring v'' upon said shaft adapted to press said clutch into engagement, a lever V''' pivoted on a cross-piece secured to the upper frame-bars and held in a stop and adapted to control said clutch-box, the axle of the elevator-apron roller J'' projecting parallel to the shaft V, a spur-pinion j'' on said axle gearing into the spur-rim of the combined spur and bevel wheel, a longitudinal shaft H<sup>5</sup> having one end journaled in the right-angled branch 6' of the bearing 6 and the other in a bearing secured upon the front ends of the main and auxiliary framesides, and a bevel-wheel v' on said shaft gearing into the bevel-rim of said combined spur and bevel wheel, substantially as set forth.

In testimony whereof I have signed in the presence of the undersigned witnesses.

JOHN S. McCORMICK.

Witnesses:

A. HARVEY,

A. TROWSSE.