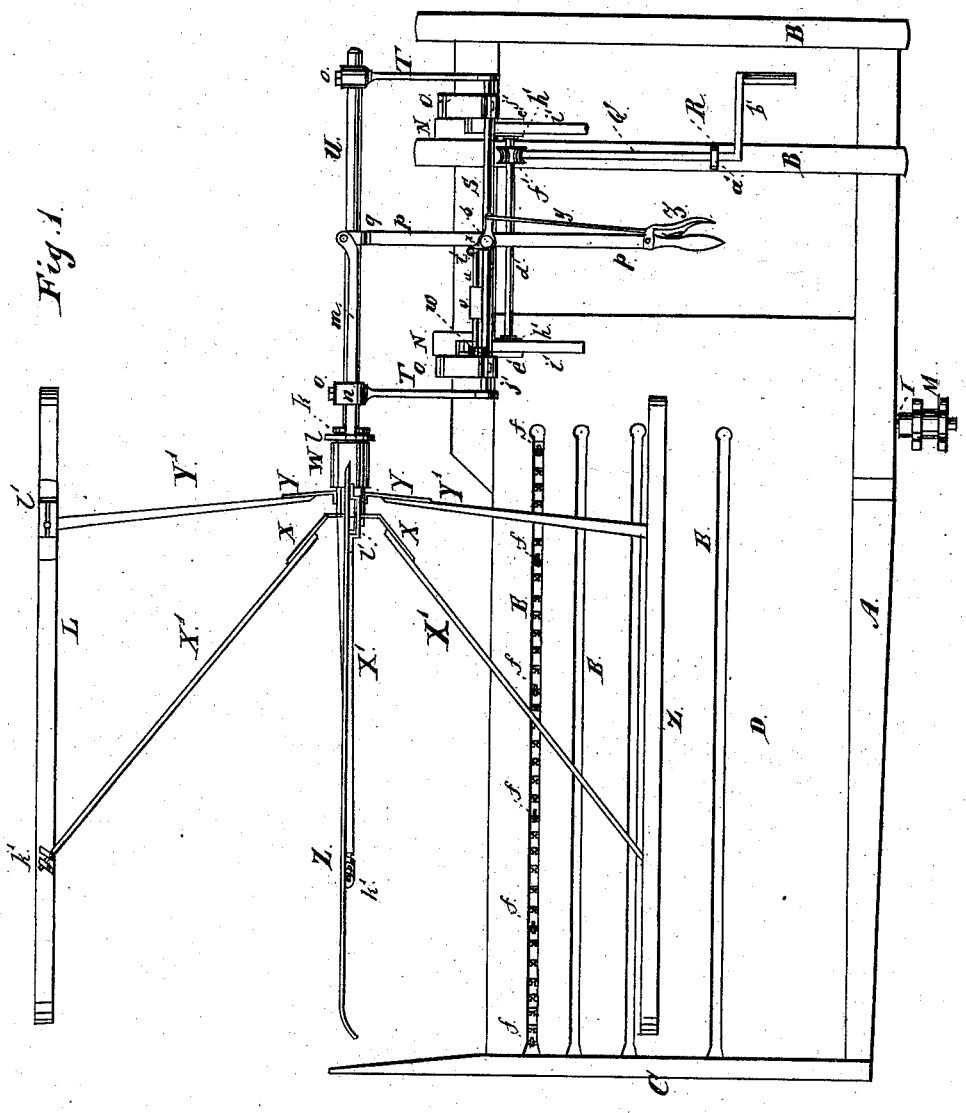
3 Sheets—Sheet 1.

C. WHITNEY.

Harvester.

No. 205,323. Patented June 25, 1878.

Fig. 1.



Witnesses:

Heinr. L. Bruns.

A. W. Bond.

Inventor:

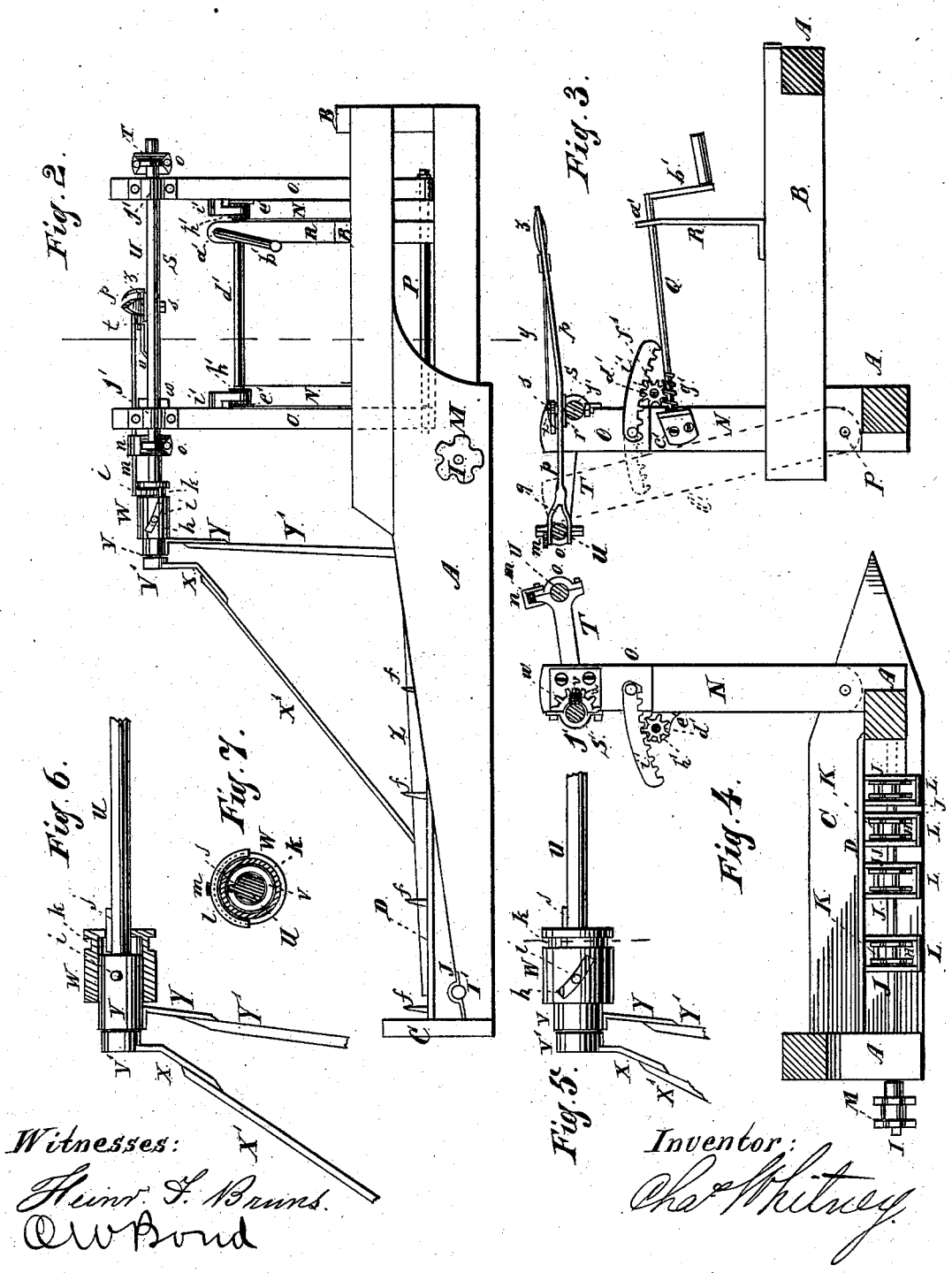
Chas. Whitney

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

3 Sheets—Sheet 2.

C. WHITNEY.
Harvester.

No. 205,323. **Patented June 25, 1878.**



Witnesses:
Heinr. F. Bruns.
C. W. Bond

Inventor:
Chas. Whitney.

3 Sheets—Sheet 3.

C. WHITNEY.

Harvester.

No. 205,323. Patented June 25, 1878.

Fig. 8.

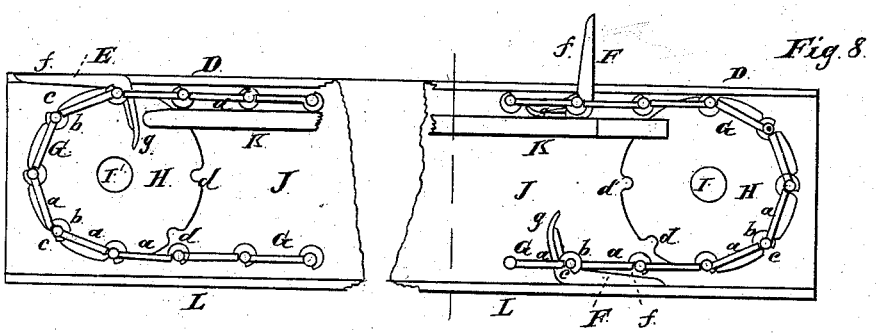


Fig. 9.

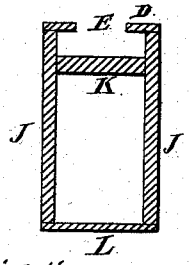


Fig. 10.

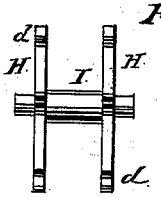


Fig. 11.

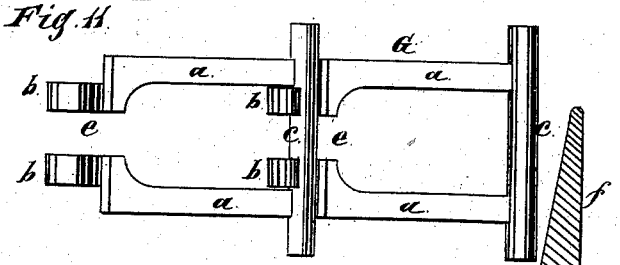


Fig. 14.

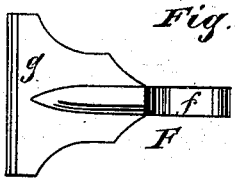


Fig. 12.

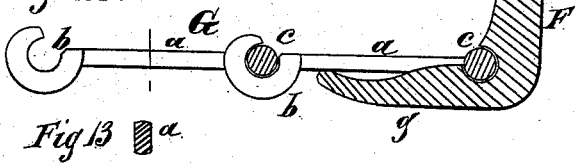


Fig 13 a

Witnesses:

Henry F. Bruns.

O. W. Bond.

Inventor:

Chas. Whitney

UNITED STATES PATENT OFFICE.

CHARLES WHITNEY, OF ST. LOUIS, MISSOURI, ASSIGNOR TO C. W. MARSH AND W. W. MARSH, OF SYCAMORE, ILLINOIS.

IMPROVEMENT IN HARVESTERS.

Specification forming part of Letters Patent No. **205,323**, dated June 25, 1878; application filed November 8, 1877.

To all whom it may concern:

Be it known that I, CHARLES WHITNEY, of the city of St. Louis, St. Louis county, State of Missouri, have invented new and useful Improvements in Harvesters, of which the following is a full description, reference being had to the accompanying drawing, in which—

Figure 1 is a top or plan view; Fig. 2, a rear elevation; Fig. 3, a cross-section, showing the reel-adjusting devices; Fig. 4, a cross-section, showing the devices for operating the carrier-platform chains and a portion of the reel-adjusting devices; Figs. 5, 6, and 7, details, showing the devices for changing the angle of the reel-slats; Fig. 8, a detail, showing the platform-chain and its operating devices; Figs. 9 and 10, details, showing the receiving-platform and frame for the chain and the operating-wheel, respectively; Figs. 11, 12, 13, and 14, details, showing the construction of the chain.

The objects of this invention are to provide improved devices for moving the grain on the receiving-platform, and in the combination of parts, as hereinafter more fully described, and pointed out by the claims.

In the drawings, A represents the main frame; B, the cross-pieces; C, the divider; D, the receiving or carrier platform; E, the openings; F, the teeth; G, the chains; H, the driving wheels or disks; I I′, the shafts; J, the guideways or frames; K, the tracks; L, the bottom pieces of the frames; M, the driving pulley or wheel; N, the stationary posts; O, the pivoted posts; P, the shaft or pivot; Q, the crank-shaft; R, the support; S, the rock-shaft; T, the arms or supports; U, the reel-shaft; V, the movable hub; V′, the stationary hub; W, the sliding collar; X Y, the hangers; X′ Y′, the reel-arms; Z, the reel-slats; *a*, the flat bars of the chain-links; *b*, the slotted or open hooks or projections; *c*, the projecting cross-bar of the chain-link; *d*, the openings in the wheel H; *e*, the opening or slot in the chain-link; *f*, the projecting portion of the teeth; *g*, the heel of the teeth; *h*, the angular opening in the collar W; *i*, the pin on the hub V; *j*, the spline or feather; *k*, the groove; *l*, the clutch; *m*, the sliding bar; *n*, the guide for the bar *m*; *o*, the bearings for the shaft U; *p*, the hand-lever; *q*, the fork engaging with the shaft U; *r*, the lever-support; *s*, the pivot or bolt; *t*, the angle-iron; *u*, the pawl; *v*, the pawl-guide; *w*, the rack; *x*, the spring for returning the pawl *u*; *y*, the rod; *z*, the bell-crank lever; *a′*, the bearing for crank-shaft Q; *b′*, the crank; *c′*, the support for the inner end Q; *d′*, the shaft; *e′*, the shaft-supports; *f′*, the gear-wheel; *g′*, the screw; *h′*, the pinions; *i′*, the racks; *j′*, the journal-boxes of the shaft S; *k′*, the pivots for the reel-arms X′; *l′*, the pivots for the reel-arms Y′.

The frame A, cross-bars B, and divider C may be of any suitable form, and a suitable drive-wheel (not shown) is to be located between the cross-bars B. The completed machine is to be provided with a sickle and devices for operating the same, and with suitable devices for operating the reel and other parts; but as such devices may be of any of the ordinary forms, they are neither shown nor described.

The platform D is secured to the main frame A in any suitable manner, and its location in the frame is such as to permit of the operation of the chains, suitable openings E being provided in the platform for teeth F, which openings may be arranged as shown in Fig. 1, or in any other suitable manner.

The teeth F are formed, as represented in Figs. 12 and 14, of two portions, *f g*, standing at right angles, or nearly so, to each other, the portion *g* being broad and flat, while *f* is long and narrow.

The chain G is formed from links having flat side bars *a*, which terminate in hooks or projections *b* at one end, and at the other end are provided with a round end bar, *c*, the ends of which project some distance beyond the side bars *a*. These bars *c* are so formed as to slip into openings in the hooks *b* of the next preceding link and lock the links together. That end of the links which has the hook *b* is not connected together, so that an opening or slot, *e*, is left between the portions of *b*. The teeth F are provided with an opening at the inner angle where the parts *f g* join, by means of which the teeth are pivoted to the bars *c* of the links to which they are attached, the teeth, when in position, being

between the slotted hook *b* of the next preceding link, and the end of *f*, when the tooth is folded, coming over the bar *c* of the next preceding link and between the hook *b*, which connect such link to its preceding link.

The wheels for operating the chains G are formed of two disks, H, attached to the shafts I I′, which shafts are suitably journaled in the frame A at or near the ends of the platform D. The peripheries of the disks H are provided with circular openings *d*, (see Figs. 8 and 10,) so arranged as to engage with the projecting ends of the bars *c* and operate the chains which pass between the disks H.

The frame or guideway for inclosing the chain and drive wheels is formed from side pieces J, suitably secured at their upper edges to the platform D, and a bottom piece secured to the side pieces. Near the top of the frame or guideway is located a track, K, secured in any suitable manner to the side pieces J, the ends of which do not extend to the ends of the frame, but stop at or near the inner line of the shafts I I′.

The shafts I I′ are driven by means of suitable sprocket or pulley wheels M, secured to their rear ends.

The frame or guideways for the chains and wheels or disks H are so located as to bring the wheels or disks on the shafts I I′ beneath the openings E in the platform D, so that the chains G will be directly beneath the openings E, to permit the portion *f* of the teeth F to project above the platform D; and four or more of such chains, with their operating devices, are to be used in a full-sized machine.

In operation, power for operating the shafts I I′ is applied to the shaft I, at the inner end of the platform D, from the drive-wheel, (not shown,) in any suitable manner, which power is communicated to the wheels or disks H, causing them to revolve, carrying around the chains G, by reason of the engagement of the projecting ends of the bars *c* with the openings *d* of the wheels or disks. As the chains are carried around, the outer end of the heel or portion *g* of the teeth F will come in contact with the end of the track K; and as the chain moves forward this engagement will raise the portion *f* of the tooth in the opening E, causing it to assume a vertical position. Then as the chain is carried forward the part *g* of the tooth will ride up on the track K, and be carried along thereon, keeping the portion *f* in a vertical position as long as *g* is on top of the track K. When the part *g* passes the end of the track K, the part *f* will come in contact with the platform D at the end of the opening E, or with a suitable stop, throwing the end *f* of the tooth down, bringing *g* in contact with the side bars of the link, the end of *f* being in the opening or slot between the ears *b*. Then as the chain G is carried around the wheel or disks H on the shaft I the part *f* will come in contact with the bottom L, as shown in Fig. 5, and slide thereon, holding the tooth in its folded position until it has reached and been carried around the wheel or disks H on the shaft I′, bringing the tooth into the position shown in Fig. 8, and in position for the heel or part *g* to come in contact with the end of the platform or track K and raise the part *f*, as before described. As many teeth F as desired may be used, and each tooth will be raised by the end of the track, carried along the track K, folded at the opposite end, and travel back on the bottom L, and again be raised by the rotation of the disks, as described.

As shown in the drawings, the heel *g* of F is slightly curved at its outer end; but if this end is left straight the tooth will operate equally well. By this arrangement the teeth are raised and folded automatically, so that they will be always operative, and no clogging of the carrier can possibly take place.

By folding the teeth, as described, the points or parts *f* will serve both as a means for carrying the grain forward and as a base to travel on the bottom L, and the part *g*, by coming in contact with the side bars *a*, will prevent the tooth from falling forward in case no grain is in front of *f*. The raking mechanism may also be used in connection with machines in which the grain is bound either by hand or automatically, and then the grain, as it falls upon the platform, will be carried forward to the binder by the teeth F, the portion *f* being back of the grain which is being moved, and when the grain has reached the desired point the part *g* will leave the track K, and the part *f* will be withdrawn from contact with the grain, leaving it in position. By this arrangement the grain will be straightened on its passage over the platform, and will be carried on the platform and delivered in proper position for binding or other purposes, the teeth also acting with suitable devices upon the binder, when such are provided, to pack the grain in shape.

In the form of harvesters shown, a grain-binder is to be located at the inner end of the platform D; but as this binder may be of any suitable form, it is neither shown nor described.

The chain G and the teeth F can be used in that class of harvesters which elevate the grain over the drive-wheel, in which case the elevator is to be formed of similar chains and teeth, operated by suitable devices.

It will be seen that the teeth F can be attached to the bars *c* and detached therefrom readily; and that when in place they will be held laterally by the hook *b*, between which, in the opening or slot *e*, they are located, and will be free to turn on the bar *c*, so that if a tooth becomes broken it can be readily replaced, and by so attaching and locating the teeth they will also be allowed to fold and pass around the operating-wheels easily.

By making the heel *g* broad, as shown, it will come in contact with the flat bars of the link, and prevent the part *f* from tipping sidewise in either direction; and it also forms a flat surface for sliding on the track, so that this part or heel *g* forms a stop, and also acts

as a base when the part *f* is standing in a vertical position.

In manufacture, the tooth is placed in the opening *e* between the hook *b*, and the opening in the inner angle is brought in line with the opening in the hook, when the bar *c* can be slipped in, holding the tooth in place and securing the links together.

The posts N are secured at their lower ends to the frame A in any suitable manner, and extend up some distance above the frame, and to these posts, just above the frame A, are pivoted the uprights or posts O. As shown, these posts, at their lower ends, are attached to the rod or shaft P, which has its bearing in the posts N, so that the shaft P and posts O form a swinging frame to support the reel; but in practice the posts O and shaft P may be formed from a single piece of iron or other suitable material, if desired. Near the tops of the posts O is located the rock-shaft S, the journal-bearings *j* of which are secured to the posts O. The ends of the rock-shaft S project a short distance beyond the posts O, and to them are permanently secured one end of the arms T. The other end of each arm is provided with a bearing, *o*, in which is supported the reel-shaft U, the inner end of which is provided with a suitable pulley or sprocket-wheel, (not shown,) by means of which the reel is operated. At the reel or outer end of the shaft U is permanently secured to the shaft a hub, V′, having a hanger or arm, X, formed therewith or permanently secured thereto. On the shaft U, back of the fixed hub V′, is a movable or loose hub, V, located on the shaft between the hub V′ and the spline *j*, so that it is free to vibrate on the shaft within the limit of the slot *h*, but cannot move back and forth thereon, which hub V is provided with a pin or projection, *i*. Around this hub V is a collar, W, which is free to slide back and forth thereon.

In this sliding collar W is an angular slot or spiral groove, *h*, with which, when the parts are in position, the pin *i* engages, so that the collar W, when slid back and forth, will partly revolve the loose hub V. The collar W is prevented from turning on the shaft U by the spline *j*, permanently secured to the shaft U, and the hub V is prevented from revolving independently of the collar W by reason of the pin *i* engaging with the slot *h*, so that neither the hub V nor collar W can revolve independently of the shaft U, but can only revolve with it as the loose hub V is partly rotated by the sliding collar, as before described.

In the collar W is a groove or open channel, *k*, with which the clutch or head *l* engages. This clutch *l* is permanently secured to the end of the bar *m*, which bar slides back and forth in the guide *n*, secured to the bearing *o*. The other end of the bar *m* is pivoted to the outer end of the lever *p*, so that as the lever is moved back and forth the arm *m* will slide in *n*, carrying with it the collar W by means of the clutch *l* and groove *k*. The lever *p* is supported on the plate or bearing *r*, permanently secured to the shaft S, and is held in place on the bearing *r* by means of the bolt or pivot *s*. The outer end of this lever *p* is provided with a fork, *q*, which passes on each side of the reel-shaft U. Above the lever *p*, on the pivot or bolt *s*, is an angle-iron, *t*, which is held in position on the pivot; and around the pivot or bolt, above the angle-iron *t*, is a coil-spring, *x*, so arranged as to engage with the angle-iron *t* and return the pawl *u* to its engagement. One end of this angle-iron *t* is pivoted to a pawl, *u*, which slides in the bearing *v*, permanently secured to the shaft S. This pawl is arranged to engage with a rack, *w*, which is secured to the post O in any suitable manner. To the end of the lever or angle-iron *t* is secured one end of the rod *y*, the other end of which extends down the lever *p*, and is connected to the bell-crank lever *z*, which lever is pivoted to the lever *p* near its inner end. The inner end of the lever *p* is arranged to be within easy reach of the driver.

The support R, as shown, is secured in any suitable manner to one of the cross-bars B, and is provided at its upper end with a suitable bearing, *a′*, for the crank-shaft Q, the other end of which shaft is supported in a plate or bearing, *c′*, secured to one of the uprights N, and a suitable crank, *b′*, is provided for operating the crank-shaft.

The shaft *d′* is supported in suitable bearings *e′*, secured to the upright posts N, and to this shaft *d′* is permanently secured a cog-wheel *f′*, so arranged on the shaft as to be directly above the crank-shaft Q, which wheel *f′* engages with a screw-thread, *g′*, formed on or permanently secured to the shaft Q. Near each end of the shaft *d′*, and secured thereto, is a pinion, *h′*, so arranged as to engage with the racks *i′*, one of which is secured to the inner faces of each of the swinging posts O, so that as the pinions *h′* are revolved they will cause the racks to operate the swinging frame and adjust the reel fore or aft.

The reel-slats Z are supported by the arms X′ Y′, and these arms X′ Y′ are respectively secured at their upper ends to the brackets or hangers X Y on the stationary hub V′ and loose hub V, respectively. The lower ends of the arms X′ are secured to the reel-slats Z by means of a suitable connection, *k′*, and the lower ends of the arms Y′ are secured to the reel-slats Z by means of a suitable connection, *l′*, so that the slats can be turned on the connections *k′ l′* to change their angle.

By connecting the arms X′ rigidly to the hangers X, formed with the stationary hub V′, and the arms Y′ rigidly to the hangers Y, formed on the loose hub V, and providing the arms X′ Y′ with pivotal connections to the reel-slats Z, it will be seen that the arms X′ must remain stationary, while the arms Y′ must be moved by the rotation of the loose hub V′, so that these arms Y′ will turn the inner ends of the slats on the pivots *k′ l′*, so as

to change the angle at which they stand and adjust the slats to the standing condition of the grain.

In operation, the reel is adjusted forward and back by the operator taking hold of the crank b' and turning it to the right or left, as desired to move the reel in or out. When turned to the right, the reel will be carried out by reason of the screw g' revolving the wheel f', and through it the shaft d', causing the pinions h' to revolve, which, through the racks i', move the swinging frame or posts out, carrying with them the reel; and when the crank b' is turned to the left the movement of the screw g' will reverse the movement of the wheel f', and through it the motion of the shaft d' and wheels h', which, acting on the racks i', move the swinging frame back, and with it the reel. By this arrangement the operator can rapidly and easily effect the fore-and-aft adjustment of the reel, and when the desired position is reached the reel will be held in that position by reason of the engagement of the screw g' with the wheel f' without the aid of any clutch-pawl or other devices, so that the same devices for adjusting will hold it in position when adjusted.

The reel is raised or lowered by the operator taking hold of the lever p, and, through the bell-crank z, rod y, and angle-piece t, withdrawing the pawl u from its engagement with the rack w, when, by pushing down on the lever p, the reel will be raised, or by raising the end of the lever p the reel will be lowered; and when the desired position is reached the operator releases the bell-crank lever z, when the spring x acts on the angle-iron t and throws the pawl u into engagement with the rack w, holding the reel in position.

The reel-slats are thrown in or out, to adapt them to the standing condition of the grain, by the operator taking hold of the lever p and moving the end of it forward or back, or to or from the receiving-platform. When the lever is moved toward the receiving-platform, the outer end, through the rod m and connecting piece or clutch l, will carry the collar W toward the reel-supporting frame, and this collar, by means of its angular groove h and pin i on the hub V, will partly rotate the hub V, carrying the reel-slats Z to the proper position to sweep the grain when leaning toward the right onto the platform, so that it will fall nearly straight. When the lever is moved in the opposite direction, the movement of the arm m and collar W is reversed, and, through the slot h and pin i, the hub V is turned in the opposite direction, carrying the reel-slats to an opposite position, and in proper position to sweep the grain when leaning to the left onto the platform, so that it will fall nearly straight thereon. By this arrangement the operator can, by means of the same lever, raise and lower the reel and change the angle of the slats to the proper one to cause leaning grain to fall on the platform straight, or nearly so.

The spring x, for returning the pawl u to its engagement with the rack w, might be located between the lever p and bell-crank lever z, being arranged to throw the lever z out, and through the rod y operating the angle-iron t and pawl.

By locating and supporting the lever p directly on the rock-shaft which carries the reel, any movement of the lever will act directly on the rock-shaft, and through it on the reel.

What I claim as new, and desire to secure by Letters Patent, is—

1. A chain-link consisting of side bars a, projecting end bar c, and slotted hook b, all constructed and arranged substantially as and for the purpose specified.

2. The chain G, constructed of the bars a c, with openings e, in combination with the teeth F, having the projecting part f and bearings for the bar c, substantially as and for the purpose set forth.

3. In combination with a link having a slotted hook and operating therein, the tooth F, capable of being attached to or detached from the chain, and provided with a broad base or heel, operating against the link to act as a stop to prevent the tooth from tipping forward or back, substantially as specified.

4. The lever p, supported on the rock-shaft S, in combination with suitable devices to change the angle of the reel-slats and to raise and lower the reel, whereby both operations are performed by the same lever, substantially as and for the purpose specified.

CHAS. WHITNEY.

Witnesses:
O. W. BOND,
H. F. BRUNS.