

(No Model.)

5 Sheets—Sheet 1.

J. F. STEWARD.
HARVESTER.

No. 477,709.

Patented June 28, 1892.

Fig. 7.

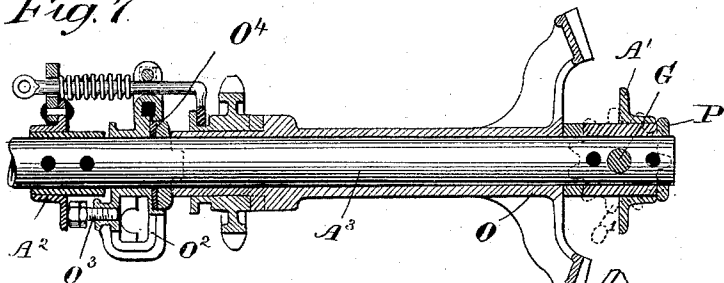


Fig. 8.

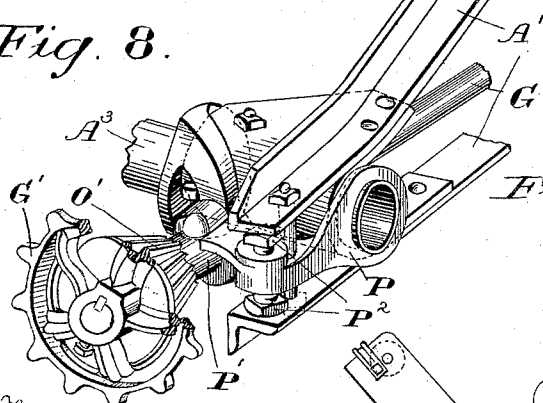
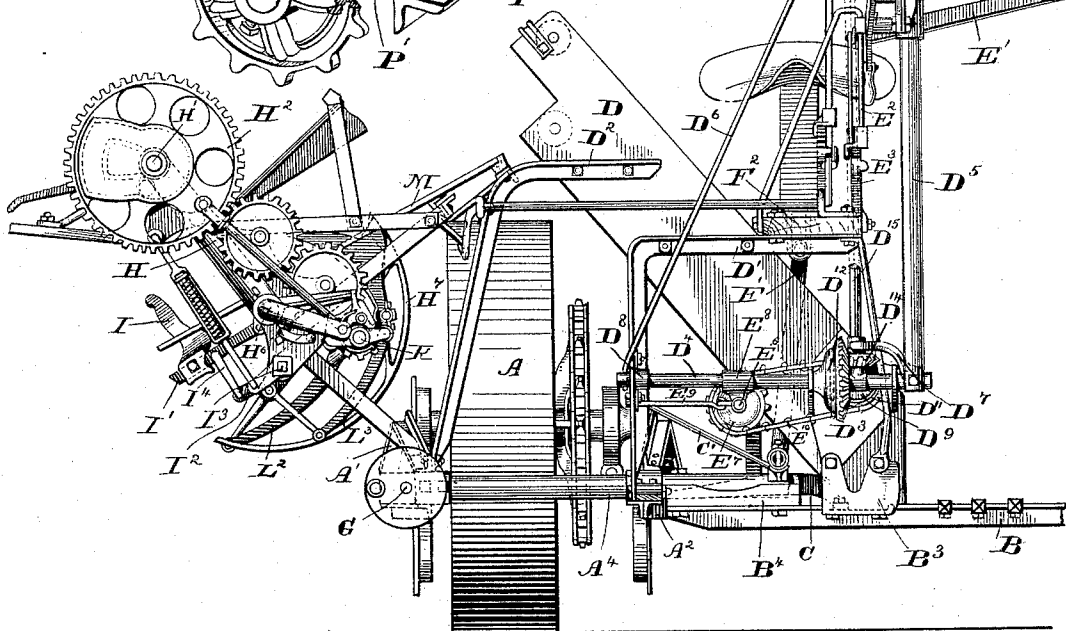


Fig. 1.



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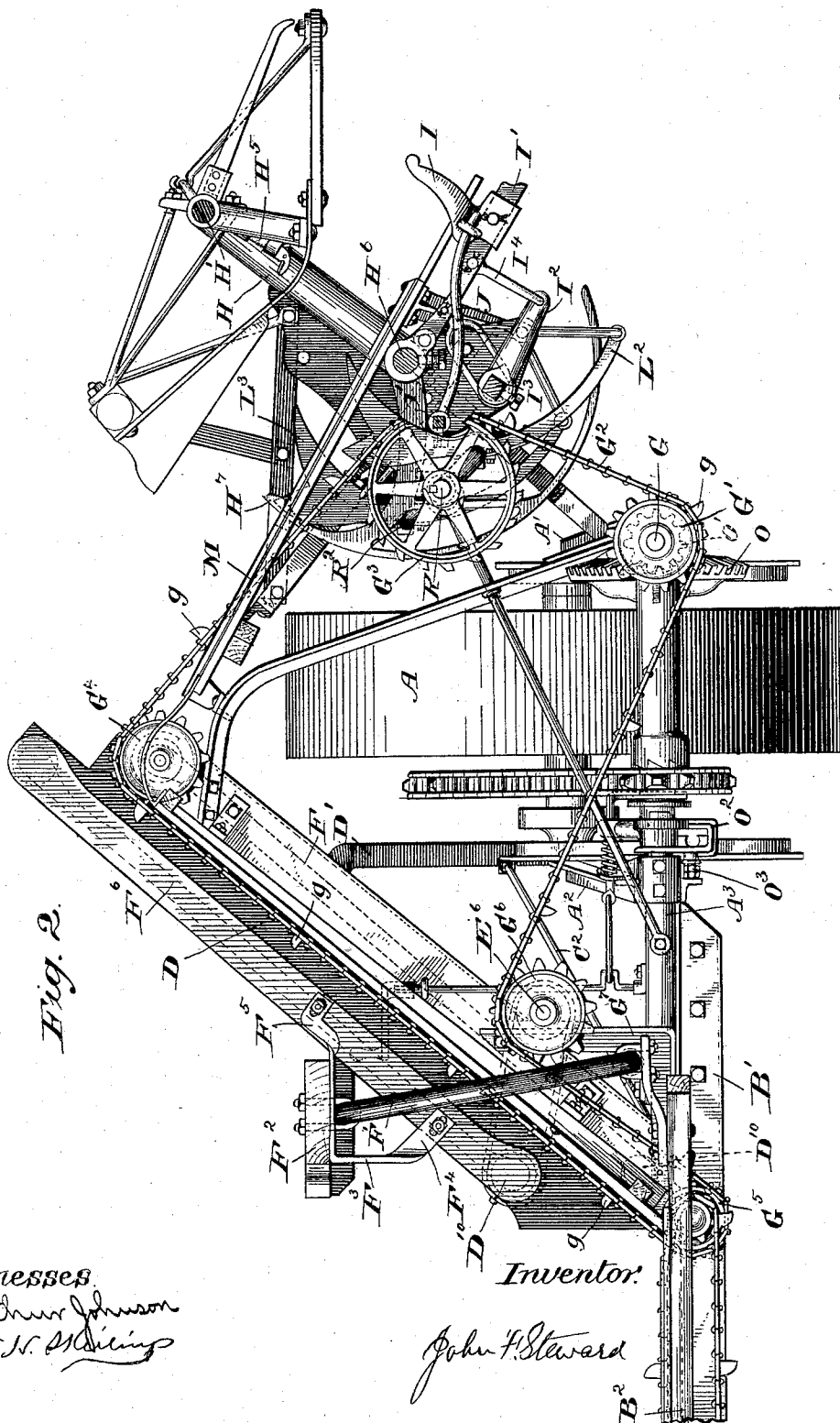


Fig. 2.

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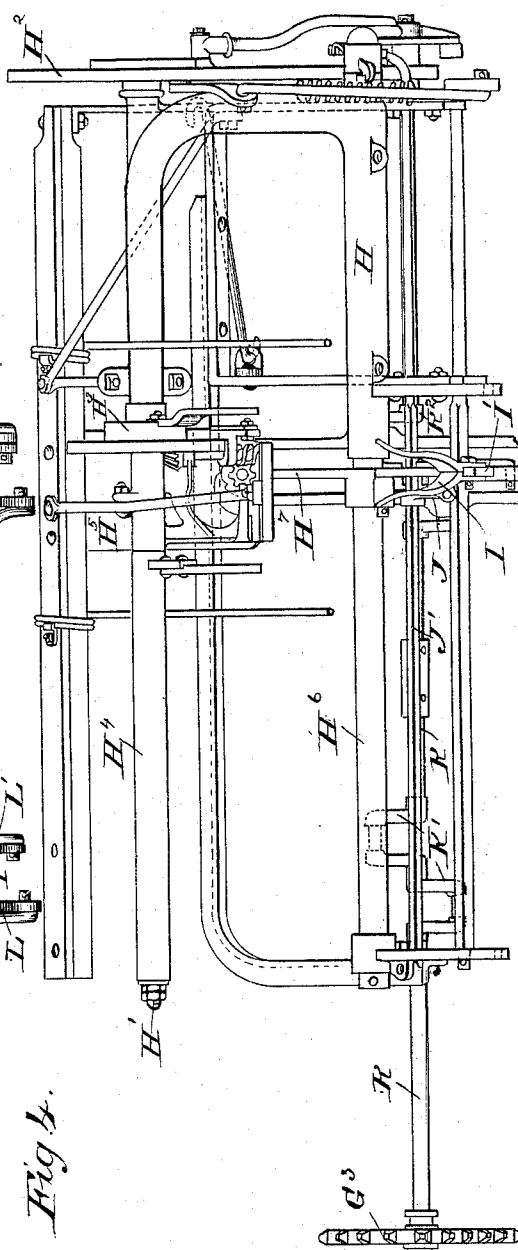
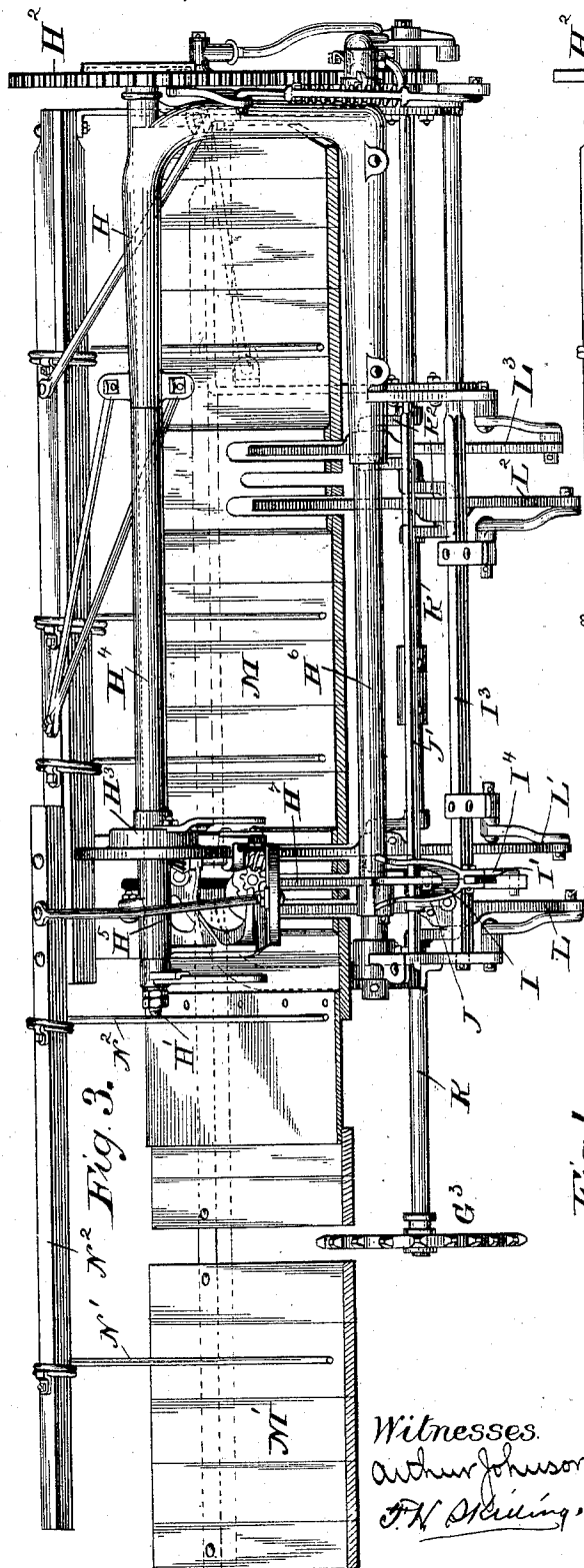
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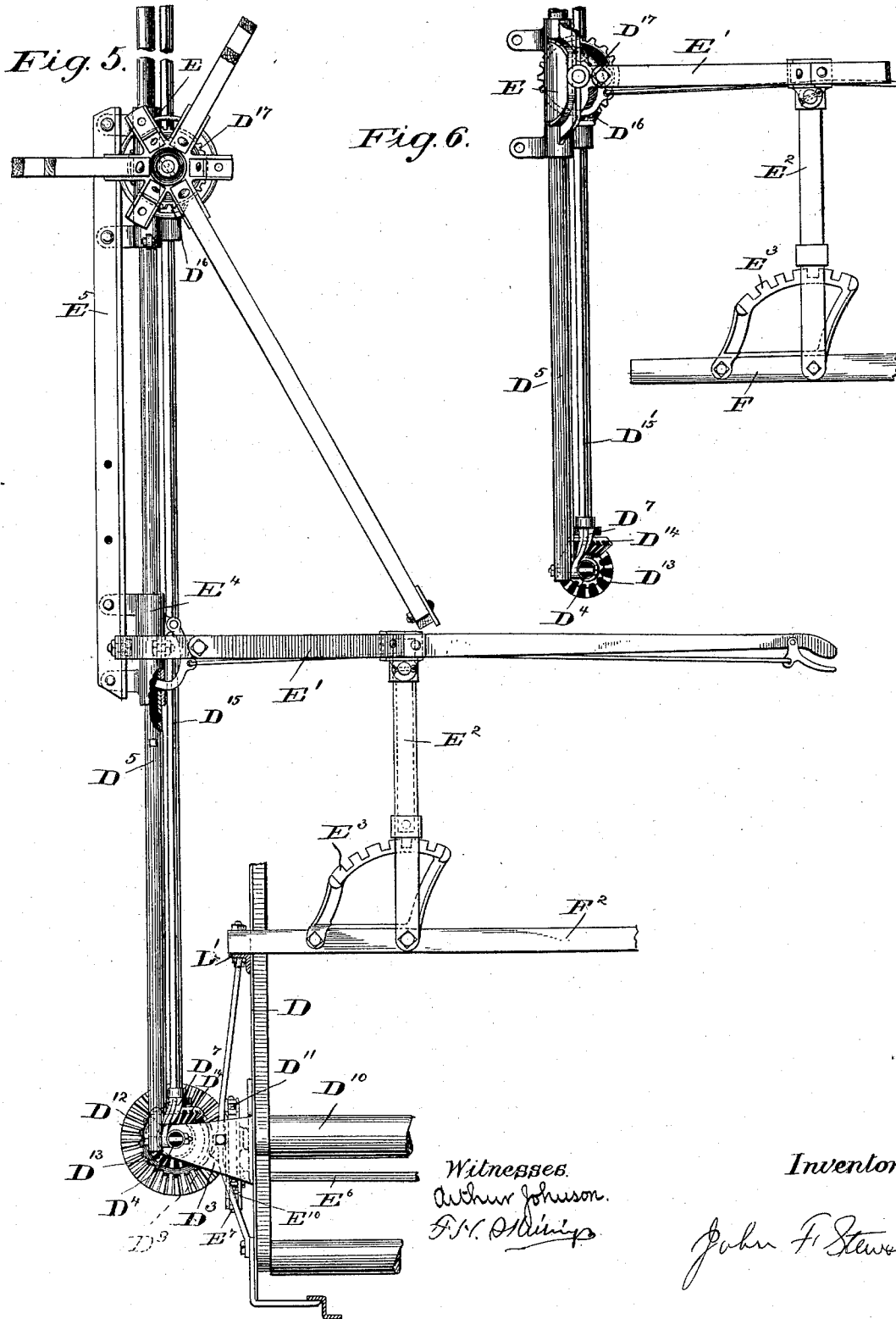
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5 Sheets—Sheet 5.

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Fig. 9.

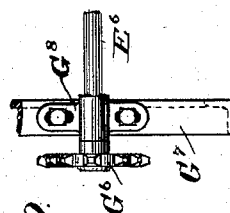
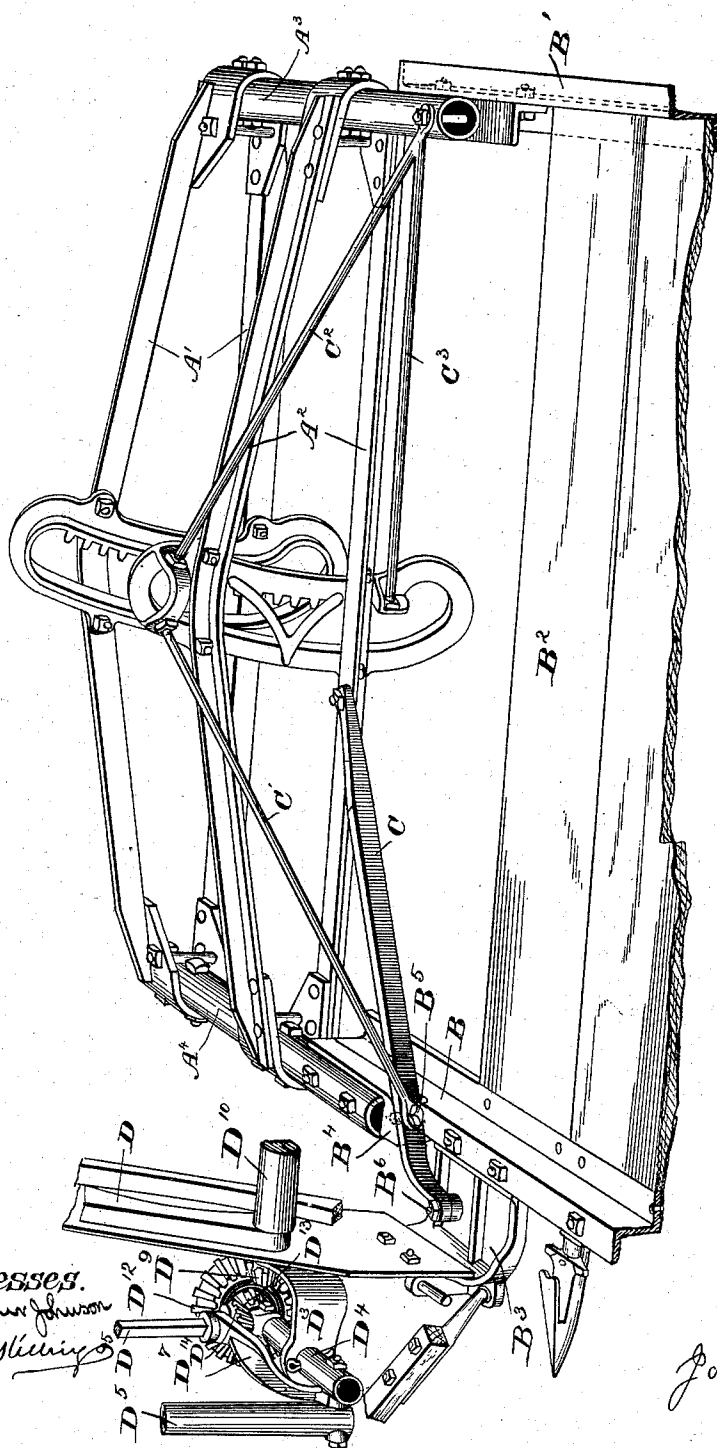


Fig. 10.

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SPECIFICATION forming part of Letters Patent No. 477,709, dated June 28, 1892.

Application filed June 21, 1890. Serial No. 356,299. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. STEWARD, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Harvesting-Machines, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of so much of the machine as is necessary to show the parts which are new. Fig. 2 is a rear elevation of the same. Fig. 3 is a stubble-end view of the binder attachment. Fig. 4 is a stubble-end view of the same, showing the parts in a different position of adjustment. Figs. 5 and 6 are details of the reel. Figs. 7 and 8 show the means for supporting the bearing for the crank-shaft and holding the pinion of the crank-shaft and gear which drives it into mesh. Fig. 9 is designed to illustrate the construction of certain parts of the main frame. Fig. 10 shows the construction of the bearing for the reel-driving shaft so that its sprocket-wheel may serve as a tightener of the chain which drives the lower elevator and binder attachment.

The object of this invention is to so provide that a machine may be adapted to work upon crops of exceeding length—as, for instance, long rye, corn, sorghum, or other fodder products—as well as short grain, if required; and its nature exists in giving the reel extreme positions of adjustment and also in giving the binder various extreme positions of adjustment, in means for actuating the parts so adapted for extreme adjustment, and in various details of construction, which will be fully pointed out.

A is the main supporting-wheel, its axle supported in the usual quadrants, the latter secured to the frame-pieces, preferably of truss form, as A' and A², secured to the sills A³ and A⁴.

B is the finger-bar; B', the rear sill; B², the platform, and B³ the shoe.

In order to brace the frame to keep it from getting out of square and also to brace the trusses and hold them erect, I use the braces C, C', C², and C³. I do not claim the system of bracing here shown, because that is already secured to me in Patent No. 396,245; but I have improved the construction there shown

by making the brace C a strong bar of iron, securing it at its rear end to the truss, preferably near the axle-quadrants. It may be, however, secured to the quadrant or any other suitable portion of the frame-work.

B⁴ is a saddle-piece adapted to lie between the sill A⁴ and the finger-bar B. I make this also serve as a part to secure the brace C to the finger-bar and bolt it firmly to the shoe B³ by means of the bolt B⁵. Heretofore the weight of the reel and of the upper frame-work of the machine has rested upon the shoe, and the pressure has had the tendency to tip the said shoe forward and downward, and also, because of variations in manufacture, the shoe has not always been brought to a definite position. Again, the draft of the tongue coming upon the shoe, there has been a tendency to tip it upward, especially when the machine is tilted down. Extending the brace C forward and bolting it to the shoe, the latter is always held positively in place.

D is a part of the forward A-frame, to which is attached the slides and guides for the elevating-canvases, the latter forming bearings for the journals of the elevating-rollers.

D' is a support for the forward end of the seat-board, properly secured to the A-frame board.

D² is a support for the upper end of the elevator-frames, footed upon the main frame in the usual manner. Secured to the A-frame board is a plate of metal D³. To this, as shown in Figs. 5 and 9, the reel is pivoted, the reel-support consisting of the horizontal bar D⁴ and the vertical post D⁵, suitably braced by D⁶. The bars D⁴ and D⁵ are secured together at D⁷ by a saddle-piece, which also overreaches the hub of one of the reel-gears to hold it in place. This bar D⁴ is made, preferably, of gas-pipe and is adapted to rock in the supports D³ and D⁸, the latter of which is secured to the post D'. Upon this bar, as an axis, the reel is adapted to rock forward and backward. D⁹ is a gear on the forward end of the elevating-roller D¹⁰. Having cast as one piece with it, preferably, is a sprocket-wheel D¹¹. The pinion D⁹ is adapted to mesh into the gear D¹² and rotate it on the bar D⁴. Preferably cast as one piece with the gear D¹²

is another gear D^{13} , which meshes into the pinion D^{14} . This pinion rotates on a stud on the bar D^4 and is provided with the shaft D^{15} , which extends upward beside the reel-post and is squared where it passes through the pinion D^{16} . The reel is mounted on a shaft, as usual, and upon the shaft is the gear D^{17} , by means of which the reel is given rotation.

E is the reel-bracket, adapted to slide upon the reel-post. To it is pivoted the bifurcated reel-lever E' . The said lever is pivoted to the upright lever E^2 , which is adapted to rock backward or forward when unlocked from the quadrant E^3 .

The means for controlling the reel, as shown in Fig. 6, is not new to this application, being shown, described, and claimed in patent to me, No. 346,232.

The improvement herein claimed consists in the means for varying the height of the reel and also in connecting it with the main driving-gearing. The improvement is best shown in Figs. 1, 5, and 6. In Figs. 1 and 5 the reel-post and driving-shaft D^{15} are shown to be of great height, and a special bracket E^4 is shown to be so adapted that the forward end of the reel-lever may be pivotally bolted to it, the same as if bolted to the bracket E . When so pivoted, the bracket E^4 may be raised or lowered at will. To this I bolt the stiff connection E^5 . The bracket E is also provided with lugs, so that it may be securely bolted to the same connecting-piece. By the use of this connection the reel-bracket E may be raised to any height desired without changing the action of the reel-lever. In cutting sorghum it is necessary sometimes to raise it to an additional height of at least four feet, yet in some conditions it is not necessary to raise it so high, and hence I provide holes, so that it may be adjusted to intermediate positions, if desired. By movement of the lever adjustment of the reel is permitted when placed to its high position, as shown in Fig. 5, from the driver's seat. The bracket E^4 is extended grainward from the post to the same extent that the one E is, and the reel-lever being forked and connected to the upright lever E^2 , which cannot move sidewise, a rotary movement of either of the brackets on the reel-post as an axis is not permitted. When the lever is secured to the bracket E^4 and the stiff connection E^5 is used, the bracket E , and hence the reel, is prevented from swinging or rotating backward or forward on the reel-post.

I have made my machine to have an open end, and for that reason cannot drive the upper elevating-canvas from the rear; nor can I drive the reel from the same position. Hence I provide a shaft E^6 , which passes from rear to front of the machine beneath the elevators and to it secure the sprocket-wheel E^7 . The shaft is adapted to rotate in the bearing E^8 , which is supported upon the bar D^4 and adapted to slide thereon.

E^9 is a threaded hooked brace, passing

through the post D' and having nuts upon either side thereof, by turning which the bearing E^8 is moved so as to take up any slack in the driving-chain E^{10} .

The gearing in this machine may be of any of the ordinary constructions and the sickle-driving mechanism and elevating device the same; but in the latter I make some modifications.

F is the rear A-frame board, adapted to receive the elevator-rollers, over which an elevating-canvas is drawn.

F' is the U-shaped support secured to the platform frame-work and extending backward, upward, and forward beneath the seat-board F^2 . It may be secured at the edge of the board, or above, if preferred. Secured to the seat-board is the bracket F^3 , having the arms F^4 and F^5 slotted at their ends. To these arms is secured the upper elevator frame-piece F^6 . This frame is secured at front to the A-frame board D . In handling very bulky corn it is sometimes desirable to open the rear of the elevator to allow more room for ears and masses of stuff to pass. This adjustment is also desirable in some conditions of grain. By means of slots in F^5 and F^4 the upper elevator may be moved away from the lower one.

G is the crank-shaft, suitably connected to the main wheel by chain-and-tooth gearing, which need not be described. Upon the sprocket-wheel G^7 is thrown the chain G^2 , which passes around the sprocket-wheel G^3 on the binder packer-shaft, around the sprocket-wheel G^4 upon the elevator-shaft, around the sprocket-wheel G^5 upon the shaft which moves the platform conveyer, and around the sprocket-wheel G^6 upon the shaft E^6 . The shaft last mentioned is supported in the bearing E^8 , as shown in Fig. 10, adjustable on the post G^7 . As either end of the shaft may require adjustment to tighten the chain at front or rear independently, the shaft might when moved at the front end bind in the bearing at its rear end. To prevent this the bolts securing the journal-bearing at its rear end may be slightly loosened, so that the bearing will shift as the shaft is moved, after which the bolts securing said bearing may be tightened. Practically, then, the bearing may be considered as automatically adjusted when set free by loosening the bolts. This wheel thus serves as a tightener for the chain G^2 , and also serves to give rotation to the shaft E^6 , which gives movement to the reel and also to the driving-roller of the upper elevator. By the adjustment referred to it is thrown a little out of line; but the chain is nevertheless found to run perfectly. The chain G^2 is provided with the teeth g , which project upward slightly into the swath of grain that is being elevated and makes the movement more positive. An extension may be provided which will support the tops of the grain that project to the rear of the elevator and chain.

The binder, as far as its operative parts are

concerned, does not differ from others now in use; but means are provided whereby its parts can be adjusted to exceedingly-long grain. These improvements will be understood by reference to Figs. 3 and 4, where H is the binder-frame, having in the upper sleeve thereof the shaft H', which gives motion to the cord-uniting devices and bundle-discharging mechanism. This shaft is rotated by a gear H² at its front end and has the knotter-moving cam-wheel H³ keyed thereto. This shaft is made much longer than the arm of the binder in which it is journaled, and to take up such additional lengths the sleeve H⁴ is used.

In Fig. 3 the knot-tying devices H⁵ are shown as located upon the rear end of this shaft and the sleeve H⁴ placed between it and the end of the main binder-frame sleeve. This is the position of adjustment desirable for binding sorghum, corn, and other long crops.

In Fig. 4 the knot-tying devices are shown as placed adjacent to the end of the sleeve of the main binder-frame which forms the bearing for the shaft, and the sleeve H⁴ is placed at the rear thereof. By unscrewing the nuts from the rear end of the shaft H' the knotting device and the sleeve H⁴ may be quickly transposed.

H⁶ is the needle-shaft, and H⁷ the needle. This needle is keyed to the shaft and is capable of being moved to any position to correspond with the fore-and-aft adjustment of the knotting device.

The compressor I is supported upon the arm I', which in turn is pivoted to the heel of the needle.

I² is an arm on the compressor-shaft I³, the said arm being connected to the compressor-support by the link I⁴. This arm is adjustable along the compressor-shaft, so that when the needle is moved it can be moved to a position beneath the compressor, in order to operate the same properly. As the binding and compressing device in all other respects conforms strictly to binders now in general use, I need not describe them further than to say that the clutch-tripping arm J is adjustably secured upon the long shaft J', and on this shaft it may be slid to conform to the position of the needle.

K is the packer-shaft, provided with the cranks K' and K². The cranks K' are placed well toward the rear of the binder and the cranks K² in the position suitable for binding grain. When desirable, each pair of these cranks may be provided with packers, as shown in Fig. 3, where they are represented by L, L', L², and L³ as of the ordinary construction, suitably linked to supports upon the binder-frame. For convenience I link the packers to supports secured to the shaft L³; but this does not form part of my present invention and need not be described, as they are sufficiently shown in Fig. 3.

M is the binder-table, to which I apply the

rearward extension M'. In order to control the rear end of the grain, I provide the additional spring-wires N and N', secured to the supplemental rail N².

In Fig. 7 I show means whereby the main gear O is moved into mesh with the pinion O'. O² is a casting surrounding the axis of the gear O, and between it and the gear sleeve is shown a washer O⁴. The casting O² is adjustable by means of the set-screw O³. In order to adjust the height of the pinion O' relative to the gear in which it meshes, I provide the bracket P on the sleeve upon which the gear O revolves and place loosely in it the bearing P' for the crank-shaft. P² are set-screws, the heads of which rest upon the bars of the truss. By adjusting these screws the crank-shaft may be moved upward or downward and put into adjustment with the gear which drives it and keeps it there.

I shall claim the construction of the binder whereby it is made to be extensible as distinct from adjustable; also, the reel. In each I provide special means whereby the parts which act upon the grain are adapted to be extended in the direction that long grain requires—as, for instance, in adapting the machine for the cutting of corn and sorghum.

Although the seat and elevator support F passes upward in the rear of the elevator, it is adapted to be placed so far to the rear as to make the machine practically open at its rear, and I shall treat it as a rear-opened machine.

I am aware that it is old to adjust the band-uniting mechanism and the needle upon their respective shafts; but I arrange and place the parts so that by mere use of extension-pieces and by transposition of parts the machine is adapted to work upon corn or upon short grain, as the case may be. For the purpose of moderate adjustment to the length of the grain while the machine is running, the whole binding attachment may be moved, as is done in ordinary machines.

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

1. The combination of the open-end elevator, the binder having a supplementary table by which it is made extensible in a rearward direction relative to the main binder-frame and having a rearwardly-extended knotter-driving shaft, by means of which the knotting devices may be moved rearwardly relative to the main binder-frame, and the long needle-shaft whereby the needle may be moved to a rearward position and the binder thus made extensible in a rearward direction, all of said extensions and adjustments in a rearward direction being made relative to the main binder-frame, whereby long crops be handled without adjusting the main binder-frame rearward, substantially as described.

2. In combination with an open-end elevator, a binder-frame secured to the said harvester-frame and having a long needle-shaft and a long knotter-driving shaft, a needle and

- a knotting device secured to said shafts and adapted to be moved to a rearward position relative to the main binder-frame, so as to overreach the butts of very long grain, said harvester having a reel adapted to be moved to a high position to overstep long grain, the extensibility of the reel and the extensibility of the needle and the knotting devices in a rearward direction accomplished by interposing between the reel - adjusting devices a lengthening-piece, and lengthening-pieces between the said needle and said knotting devices and the main binder-frame, substantially as described.
3. In a harvester, the combination of a reel having an extension-piece E^5 , said extension-piece rigidly secured to the reel-bracket and to a supplemental bracket secured to the reel-lever, whereby the said extension E^5 is by means of the reel-lever prevented from rotating around the reel-post, and the reel-bracket is thus prevented from rotating or swinging around the said post, substantially as described.
4. A grain harvesting and binding machine adapted to operate upon corn or sorghum and other high crops by means of an extension-piece, whereby the reel may be supported in and be adjustable in a higher position than that in which it is held for binding grain and there controlled by an extension-support that shall also prevent the reel-bearing from swinging on the reel-post, an elevator spanning the butts of the stalks, and the self-binder provided with an elongated needle-shaft and an extension-piece that may be placed between the needle and the main binder-frame, and an elongated knoter-driving shaft having an extension-piece that may be placed between the main binder-frame and the said knotting devices and hold the latter in position, substantially as described.
5. In a binding attachment, the combination, with the main frame, of the shaft H' , the band-uniting devices mounted thereon, and the sleeve H^4 , the said sleeve and knotting device transposable in their positions, in combination with band-placing mechanism adapted to be moved on its support to a proper

position relative to the said band-uniting mechanism, substantially as described.

6. In a binding attachment, the transposable knotting device and sleeve H^4 , in combination with the band-placing mechanism and transposable packers and tripping-arm, substantially as described.

7. In a self-binding harvester, the packer-shaft having two or more sets of packers, and the band-uniting and band-placing mechanism adapted to be moved to the proper positions relative to the said packers, substantially as described.

8. In a self-binding harvester, a main binder-frame upon one end of which the driving-gearing of the said binder is sustained and having arms adapted to overreach the butts of the grain and having journaled therein a rearwardly-extending needle-shaft, a rearwardly-extending knoter-driving shaft, and a binding-table extending to the rear, said table having a slot through which the needle may move when placed in its rearmost position relative thereto, band-uniting devices, and a sleeve H^4 , the said band-uniting devices and sleeve transposable in their positions relative to the binder-frame and to a position opposing the needle when rearwardly placed, and the rearwardly-extended finger-support for yielding fingers to sustain the long grain to be handled when brought down by the packers, substantially as described.

9. In a harvester, the combination of the driving-chain, as G^2 , with the various parts of the binding and elevating mechanism and having the tightening sprocket-wheel G^6 , the said wheel mounted upon a shaft extending from rear to front and at its rear end having an adjustable bearing and at its front end having an adjustable bearing E^8 , and means for sustaining it in position, whereby it may serve as a chain-tightener, and having at its front end a sprocket-wheel adapted to give motion to the reel, substantially as described.

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Witnesses:

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