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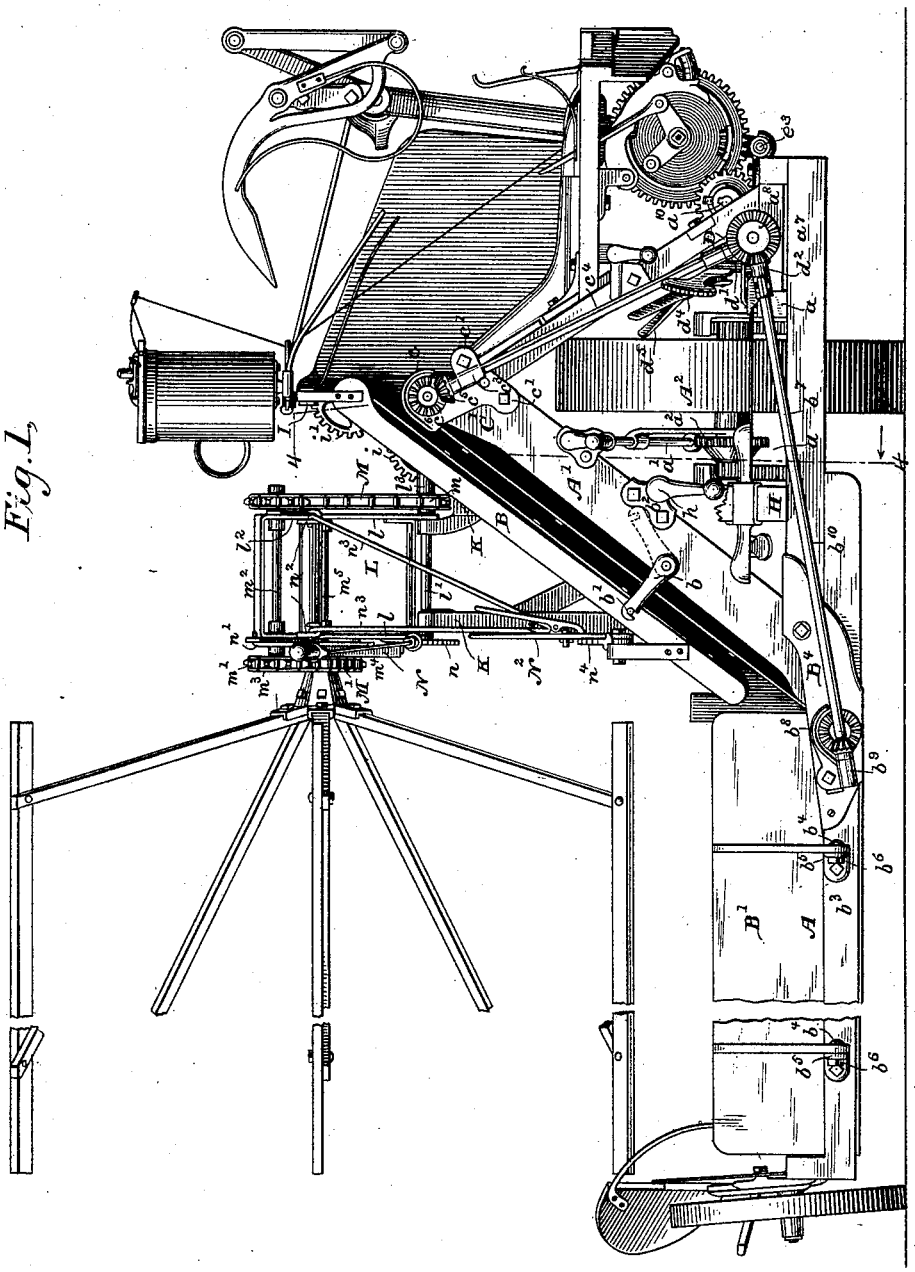
S. D. LOCKE.

HARVESTER.

No. 422,601. Patented Mar. 4, 1890.

Fig. 1.



Witnesses:

Wm A. Skinkle.

Geo N. Breck.

Inventor:

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by his Attorneys,

Pennie & Pennie

(No Model.)

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S. D. LOCKE.

HARVESTER.

No. 422,601. Patented Mar. 4, 1890.

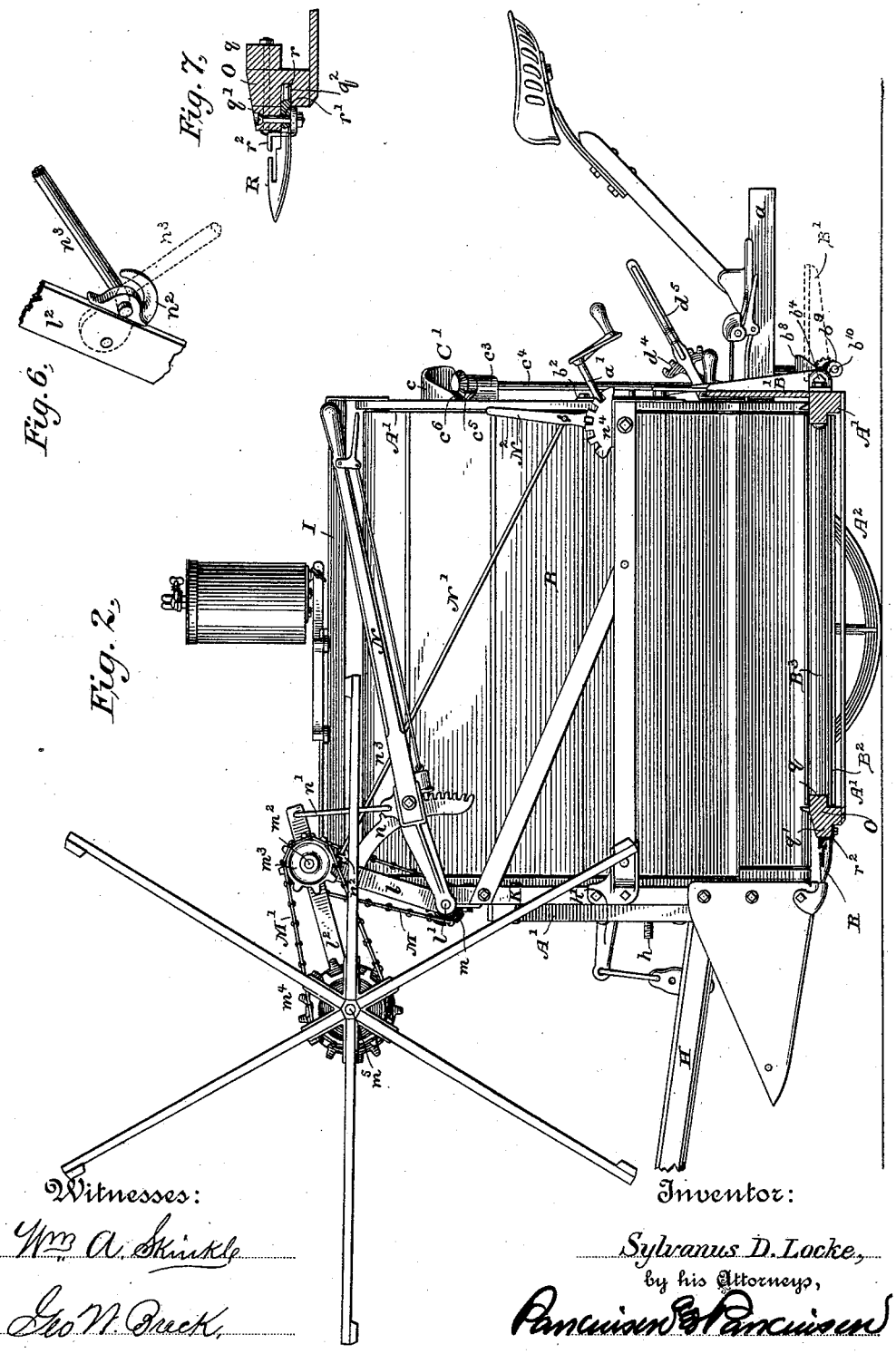

Fig. 7.

Fig. 6.

Fig. 2.

Witnesses:

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(No Model.)

5 Sheets—Sheet 3.

S. D. LOCKE.

HARVESTER.

No. 422,601. Patented Mar. 4, 1890.

Fig. 8.

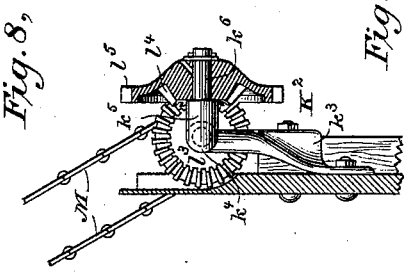


Fig. 9.

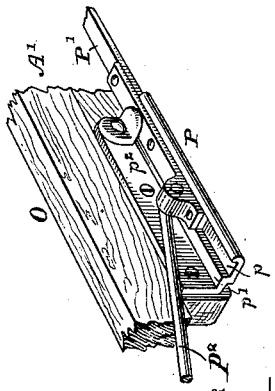
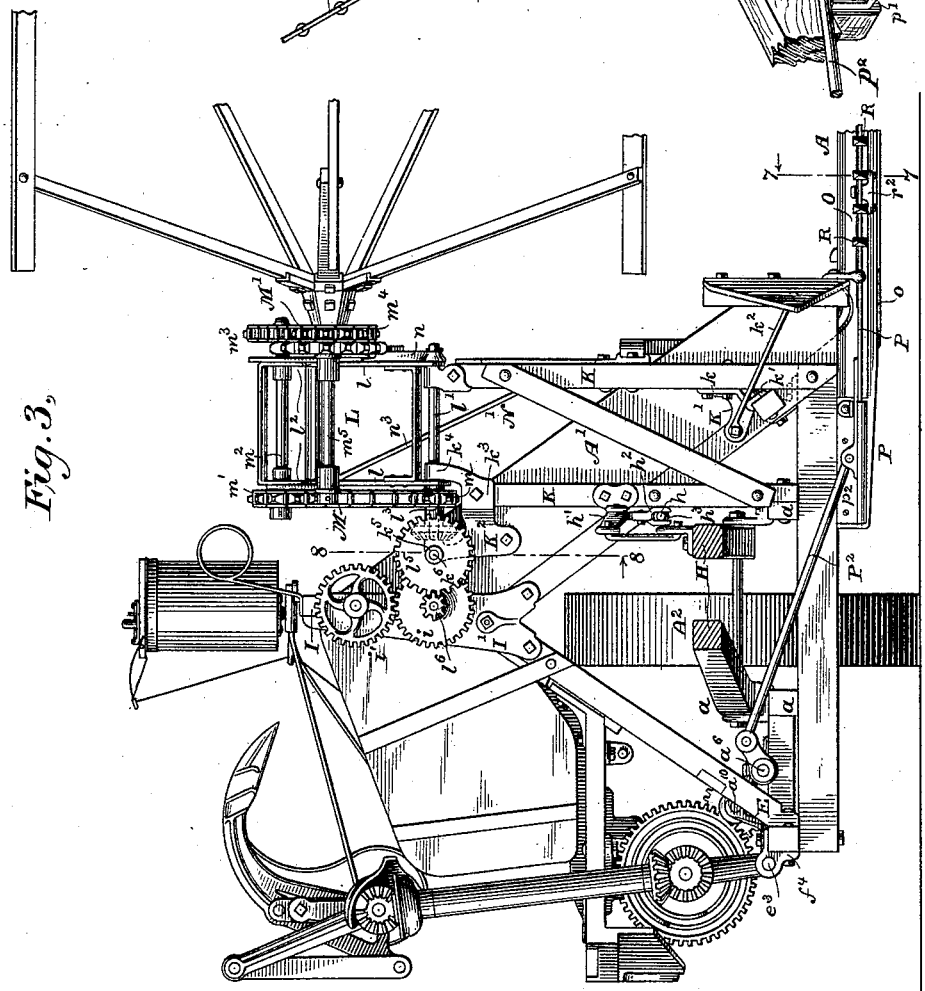


Fig. 3.



Witnesses:

Wm. A. Skinkle

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(No Model.) 5 Sheets—Sheet 4.

S. D. LOCKE.

HARVESTER.

No. 422,601. Patented Mar. 4, 1890.

Fig. 11,

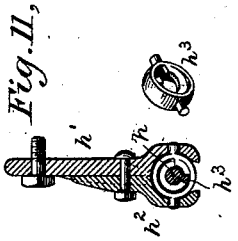

Fig. 12,

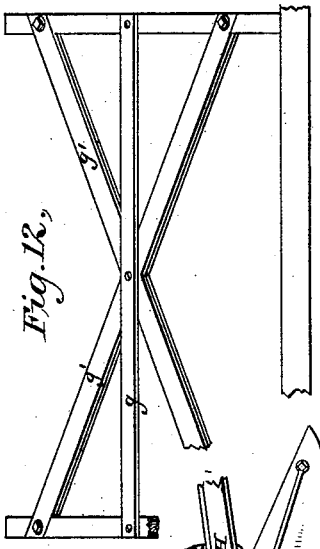

Fig. 4,

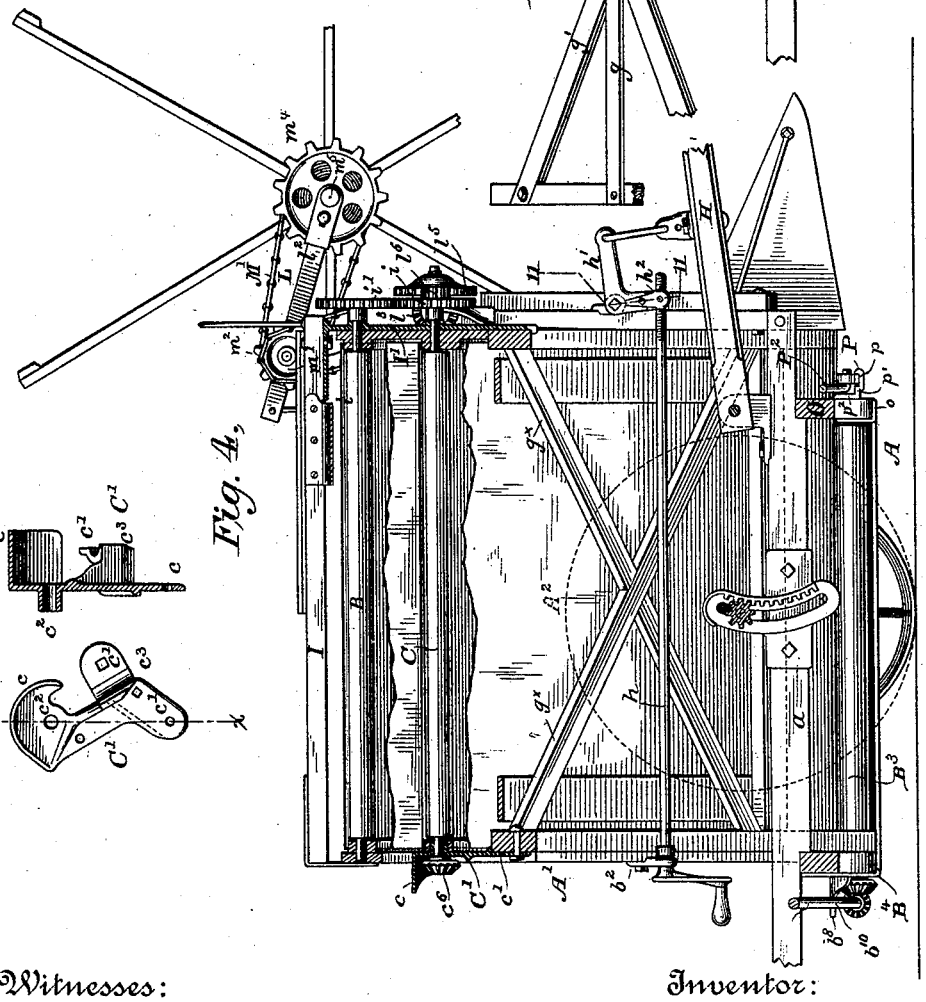

Fig. 10,

Witnesses:

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(No Model.) 5 Sheets—Sheet 5.

S. D. LOCKE.

HARVESTER.

No. 422,601. Patented Mar. 4, 1890.

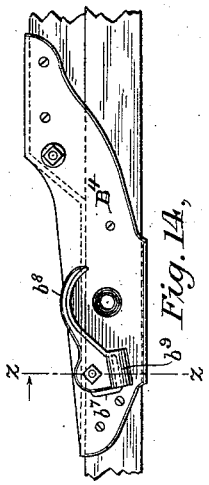
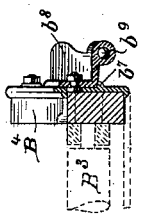


Fig. 14,



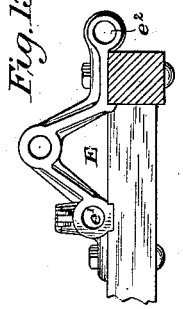


Fig. 15,

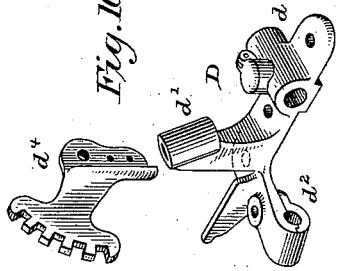


Fig. 16,

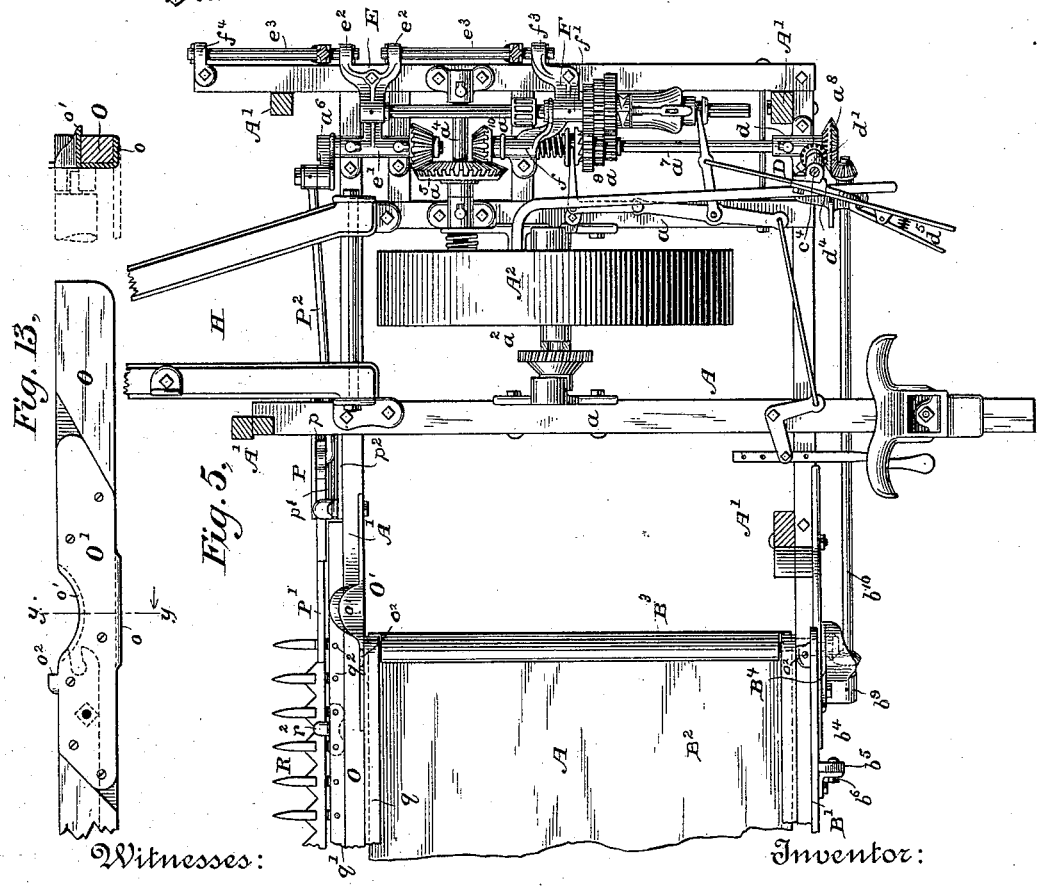


Fig. 13,

Fig. 5,

Witnesses:

Wm A. Skinkle.

Geo N. Breek.

Inventor:

Sylvanus D. Locke,

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UNITED STATES PATENT OFFICE.

SYLVANUS D. LOCKE, OF HOOSICK FALLS, NEW YORK.

HARVESTER.

SPECIFICATION forming part of Letters Patent No. 422,601, dated March 4, 1890.

Application filed May 11, 1883. Serial No. 94,633. (No model.)

To all whom it may concern:

Be it known that I, SYLVANUS D. LOCKE, of Hoosick Falls, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Harvesters, of which the following is a specification.

In Letters Patent granted to me on the 6th day of April, 1886, numbered 339,561, I have described improvements in harvesters of the Marsh type—that is, provided at the stubble end of the platform with an elevator bridging the main or driving wheel—which improvements have for their object, mainly, to reduce the depth of the machine by allowing the stalks of long grain to project at the rear of the platform and beyond the elevator as they are carried up to its head and delivered over into the binding-table or grain-receptacle.

The present invention relates in part to improvements upon harvesters of such construction and in part to improvements applicable to harvesters generally as well as to this; and it consists in combining with the platform and overhung elevator an extension-board hinged at the rear of said platform and adapted to be opened into a horizontal position to support the heads of long grain falling thereon; in combining with the overhung float or frame supporting the upper apron of the elevator a latch pivoted to the rear inner elevator-strut and catching upon a pin on said overhung frame to support it in transportation or when the grain is short; in an arrangement of shafts and beveled gearing to drive the platform-apron and the upper roller of the lower elevator-apron directly from the shaft at the stubble end of the elevator; in mechanism for driving the reel from the roller at the head of the lower elevator-apron; in improved devices for adjusting the reel in and out and up and down; in combining with the hinged tongue an elbow-lever pivoted to the frame-work at the front of the elevator and link connected to such tongue, and a crank-rod collared in a keeper at the rear of said elevator, running longitudinally therebeneath and screw-threaded into a swiveling or universal connection with the power-arm of said elbow-lever; in a support for the heel of the cutter-bar flanged in rear of said heel, to retain the right-angled end of the pitman in its socket without other fastening; in a novel method of constructing the finger-bar and attaching the guard-fingers thereto; in the use of a cam or guide-ledge preventing the displacement of the canvas belt or apron and securing its proper alignment on its driving roll or drum; in a novel manner of bracing and trussing the elevator-frame to keep it from sagging forward or back and to stiffen the platform and wheel frames and prevent them from twisting, and in various other combinations and details of construction hereinafter pointed out and claimed.

In the drawings, Figure 1 is a rear elevation of a harvester constructed according to my invention, showing a binding attachment to explain the purpose of some of the parts; Fig. 2, an elevation from the grain end of the machine, with the platform in section; Fig. 3, a front elevation showing only the inner portion of the platform and reel; Fig. 4, a vertical transverse section on the line indicated in Fig. 1, looking from the stubble side; Fig. 5, a top plan view with the elevator removed, exposing the gearing beneath said elevator for driving the cutter crank-shaft and the aprons and communicating motion to the main gear or master wheel of the binder; Fig. 6, a detail of the reel-adjusting mechanism; Fig. 7, a transverse section through the finger-bar, showing the method of attaching the guard-fingers; Fig. 8, an enlarged detail of gearing communicating motion from the upper elevator-roller to the reel; Fig. 9, the supporting-bracket for the heel of the cutter-bar, with the end of the pitman represented as secured in said bar; Fig. 10, an enlarged detail, in elevation and section, of a casting and shield affording the bearing for the rear end of the upper elevator-roller and for the shaft which drives it and shielding the gearing at said point; Fig. 11, enlarged details of the elbow-lever for adjusting the draft-tongue; Fig. 12, the truss-frame for the outer or descending side of the elevator-frame; Figs. 13 and 14, enlarged details of the construction of the finger-bar and of the rear sill—the first to provide for the forward projection of the lower elevator-apron and the second representing a bind-

ing-casting for the junction between the platform-section of said sill and that section forming the rear of the draft-frame and base of the elevator and having provisions for the reception of the end of the shaft driving the platform-apron; Figs. 15 and 16, enlarged details of other castings used in the construction of the machine and to afford the bearings for various shafts.

A is the platform, and A′ the elevator-frame; A^2, the main wheel turning upon a short axle, having fast pinions at its ends engaging with segment-racks fixed to the cross sills or timbers a beneath the elevator, and rotated to adjust the wheel up and down by means of a worm-shaft a' and worm-wheel a^2, or in any other suitable manner. The prime-pinion shaft a^4, driven by this main wheel, carries a beveled gear a^5, having two concentric series of teeth, the outer series driving the cutter crank-shaft a^6 for speed, and the inner series a rearwardly-extending shaft a^7 in line with the crank-shaft, but passing through a bearing on the rear sill and receiving beyond this a double beveled gear a^8, whereby the platform-apron and lower elevator-apron are ultimately driven. Speed-gearing a^9 on this shaft also drives a counter-shaft a^{10}, which by means of a sliding wheel or wallower communicates with the main gear of the binder. Clutches and levers, arranged substantially as in my former invention, control the movements of this train of gear and the speed to be given to the binder.

Above the elevator-frame is a float or upper apron-frame B, overhung from the front of the machine. Herein it is shown and is preferably constructed as an apron-frame and not as a mere float.

The rollers and the weight of the canvas apron itself require it to be strongly supported. In order to accomplish this and at the same time to retain the advantage of allowing the heads of long grain to project, saving in the depth and weight of the machine as a whole, I have deemed it advisable to supply a supplementary support, which may be used whenever, as often happens, the grain is for a long time of an average or stunted growth, not calling for any space beyond the minimum depth of the machine, and may during such period, and also when the machine is being transported, serve to support firmly the rear of said upper frame from the underlying elevator-frame, saving it from being strained or racked, and preserving its strength and integrity for such time as the grain is heavy and of extra length. Such a support is furnished by the latch b, pivoted to the rear inner elevator-strut and catching over a pin b' upon the rear bar of the frame. When demanded, this latch can be thrown back, and will then either hang upon its pivot or rest against a stop afforded conveniently by a bracket-casting b^2, in which is collared the crank-rod for adjusting the angle between the frame and the draft-tongue, as will presently appear.

The heads of long grain as it falls upon the platform ordinarily project and sag in the rear, and, as the platform is low and near the ground, are liable to be caught and dragged by tall stubble or by sticks or other obstructions in the field, pulling the grain off. In one instance a sliding extension-board has been attached to the rear sill of a harvester of analogous construction to support such heads. This, however, left the top of the platform clear and exposed to the wind, which is apt to sweep short and light grain off, while long and heavy grain is generally too stable to be affected by it. Instead of such sliding board, in the present instance a hinged board B′ is used, being secured by pivot-bolts b^4 to ears b^5, projecting from the rear sill, and forming when it is vertical an efficient wind-board, affording, on the other hand, when it is down, a shelf or extension to support the heads of projecting grain. To secure it in either position its pivot-bolts may be supplied with clamping-nuts b^6, by which the hinging-straps can be bound in friction contact with the ears, holding it rigidly in whichever position it is placed.

The platform-apron B^2 is driven by the roller B^3, supporting it at its inner end. This roller is journaled in a casting of malleable iron B^4, which serves as a strap to bind the two sections of the rear sill at their junction beneath the inner elevator-strut. Such casting is also formed with an angular flange or seat b^7, which receives a second or smaller casting b^8, comprising a hood shielding the beveled pinion on the gudgeon of the apron-roller, and also a step or bearing b^9 for the end of the light shaft b^{10}, running obliquely from this point to the outer face of the double beveled gear at the lower stubble side of the elevator, and meshing therewith by a beveled pinion. A single bolt secures the hood and bearing-casting in place upon the other.

The rear journal of the upper roller C of the lower elevator-apron has its bearings in a casting C′, formed substantially as shown in Fig. 10—that is, with a hood c to protect the gearing at such point, lateral arms c', one of which is bolted to the outer and the other to the inner elevator-strut, to tie the two together at their junction, an elongated tubular bearing c^2, which enters through the woodwork and gives a metallic seat to the gudgeon of the roller, and a pillow-block c^3, which receives the upper end of the light shaft c^4, engaging by beveled pinion c^5 with the beveled wheel c^6 on the end of the roller-gudgeon, and running obliquely from this point down along the outer elevator-strut to the inner side of the before-mentioned double beveled gear at the base of said strut or outer lower corner of the elevator, with which wheel it also engages, so as to be driven thereby through the medium of a beveled pinion.

To retain the three shafts which meet at this point—*i. e.*, at the lower outer corner of the elevator—the shaft running horizontally beneath the elevator from the beveled wheel on the prime-pinion shaft, the shaft running horizontally along the back of the rear sill to the inner end of the platform-apron and driving said apron, and the shaft running obliquely upward to the head of the lower elevator-apron to drive the latter—in permanent relation one to another, and to prevent the intermeshing gears from being disarranged or thrown out of engagement by any springing or starting relatively to each other of the bearing of this shaft, said bearings are preferably all formed in a single block of metal D. (Represented in detail in Fig. 16.) This is bolted to the top of the rear sill at said point, and has, first, a transverse bearing d, receiving the horizontal shaft; second, a vertical inclined bearing d', in which turns the ascending shaft for the elevator-apron, and, third, a horizontal or nearly-horizontal bearing d^2 for the lateral shaft driving the platform-apron, said bearings being so related to each other as to bring the ends of the shafts in proper position to cause a perfect fitting of the gear-wheel and pinions at this point. In addition to the bearings, the vertical standard which rises from said casting to afford the bearing for the elevator-shaft is formed with a seat for the reception of the segment-rack d^4, in which the change-speed lever d^5 latches, said segment being bolted to the standard and having a flange which clasps one end thereof, making a firm and steady connection. The pivot-pin for the lever passes through the segment and a flange of the standard, and forms, or may form, one of the fastenings for securing the two together. It should be mentioned that the casting at the apex of the rear elevator-struts, in addition to the functions already stated, projects sufficiently above the apron, and necessarily so in order to form the hood, to serve as a keeper or guide to said apron, preventing it from working laterally over the roller and projecting at the rear.

To further carry out my purpose of making strong and perfect connection between the various members of the train of gearing involved in the machine and to preserve perfect relation between the shafts and metallic supports, as well as to reduce the labor of assembling or building up, and the number of parts or pieces of furniture, the arrangement of gearing and relation of bearings for the shafts of such gearing have been so modified as to enable a triple or even quadruple burden to be performed by single castings, thus so far reducing their number that practically all the important labor devolves upon two, the first of which—the casting E at the front part of the frame—receives the cutter crank-shaft in a long sleeve-bearing e', carries upon a lateral bridge from the sleeve one end of the feathered shaft upon which the wallower travels, and finally, in eyes e^2 at the outer foot of this bridge, supports the adjacent ends of the two guide-rods e^3, upon which the binder-frame slides. The second casting F is on the other side of the prime-pinion shaft, and has near to said shaft a bearing f for the adjacent end of the long horizontal shaft running to the rear; then, in a bridge rising diagonally and rearwardly from said bearing, has a second bearing f' for the feathered shaft or speed-shaft driving the binder, and at the outer foot of this bridge, projecting beyond the stubble-girt, an eye f^3, supporting the rear end of the adjacent or hindmost guide-rod for the binder. The first of these bearing-castings may be secured to the frame by three bolts and the second by two. Besides these two and the one already mentioned at the rear which supports the ends of three shafts, there need be in the construction shown, beneath the elevator, but two independent bearings—one for each end of the prime-pinion shaft, and the clip or eye f^4 for the forward end of one of the binder-frame guide-rods. In machines of this nature the elevator-frame must be strongly trussed, since it braces all the other parts of the harvester.

In all harvesters of this type there is a great tendency of the platform and also of the elevator to twist and sag out of shape, causing derangement of the apron or belts and other operating mechanism and general ricketiness of the machine. This is due to the great weight and size of this form of harvester and the rough usage to which it is subjected. The twisting of the platform is very objectionable and has not heretofore been wholly prevented, as owing to its thinness it has not been found practical to truss it. This twisting of the platform is usually accompanied by a corresponding sagging of the elevator to the front or rear and a twisting of the elevator-frames that cause the aprons or canvas both to crowd toward one end of their carrying rolls or drums, and so inducing great loss of power and great wear of the edges of the aprons. In some of my former machines I partly succeeded in remedying this difficulty and tendency by the use of a tie-rod along the longest (or that which tended to be longest) diagonal of the elevator-frame, which in my old machine was from the rear sill at the base of the inner elevator-strut to the apex of the frame at the junction of both front struts. Any sag or deflection was taken up by means of a nut or turn-buckle; but in practice, with the weight of the binder, reel, &c., differently placed and on rough ground, it was found that this rod was often better if made a brace instead of a tie, or that it was more effective if extended from the opposite corners of the elevator-frame or at right angles to the position I had given it. Such tendency of the platform to twist and sag and such sagging and twisting of the elevator-frames are fully met and over-

come by the insertion of rigid brace-bars $g^{\times}$ in the inner or ascending elevator-frame, one extending from near the foot of the rear inner strut diagonally up to the front inner strut, and the other from near the foot of the front inner strut diagonally up to the rear inner strut. In practice I also add a horizontal bar g, which connects with the outside descending inclined struts, and is bolted or otherwise fastened at the crossing of a second pair of brace-bars g', located within the outside descending frame formed by said struts and their base-sill, the horizontal bar first named serving to support and afford a track for the inner edge of the sliding binding-table, as well as to stiffen the brace-bars and render rigid the struts. In said previous patent, also, the tongue H, hinged to the main frame, was connected to an elbow-lever h', pivoted to the elevator-frame and controlled by means of a crank-rod h, collared into the power-arm of said lever and threaded into a female screw in a keeper h^2 at the rear of the elevator, said crank-rod, therefore, as it was turned, working back and forth toward and from the driver's seat, which is advisably supported from a rearwardly-extending bar, as will be remembered; but in the present case, since this rod and its crank at the rear may otherwise at times be turned so far back as to interfere with the driver or be inconvenient for his use, it is preferred to fasten it by collars or flanges against endwise movement relatively to the keeper and to form its forward end with screw-threads, which take into a swiveled nut h^3 in the power end of the elbow-lever, so that as the rod is turned said lever may be operated to raise or depress the draft-tongue without any lengthwise movement of the rod. The nut is secured in the proper arm of the lever by trunnions, one of which takes into the arm itself and the second into a clip correspondingly shaped and fastened to said arm by a bolt, so that it may be readily removed in dismounting the machine.

The upper apron of the elevator has formerly been driven in various ways, notably by a chain belt, which, starting from the main shaft, or that shaft running horizontally beneath the elevator and terminating at the rear, led over a sprocket-wheel at the inner end of the platform-belt, then up to one or the other of the upper elevator-rollers, extending from the first to the next, and finally down to the starting-point. Herein it is driven as follows: Upon the front gudgeon of the head-roller of the lower elevator-apron is a gear-wheel i, connecting with a second gear-wheel i', of equal diameter and number of teeth, on the gudgeon of the roller of the overlying float-apron, so as to drive the latter; and for the purpose of supporting the gudgeons of these two elevator-rollers at the head of the frame, and for bracing the struts and the wind-board in front of the elevator and binding-table, and also for the purpose of supporting an overhung bar I, which receives the upper trackway for the binding-frame, a casting I′ is employed, bolted to both of said struts, to the cross-piece at the apex, and to said overhung bar.

The reel is supported upon two posts K at the front of the elevator, which are braced by a diagonal tie. The post on the platform side is secured to the harvester, in addition to other fastenings, by a casting K′, having an upright flange k bolted to said post, a diagonal flange k' embracing and bolted to the end of the cross-timber connecting the front and rear inner elevator-struts just above the main sills, and a third lateral flange serving as a seat or support for a rod k^2, bracing the nose of the inside divider and secured to the front inner elevator-strut by the same bolt securing said rod. The post on the binder side is also additionally secured at its top by a strap-casting K^2, which is bolted at its main web or body to the front board of the elevator, is bent up and over from said web in one direction to form a keeper k^3 for the reel-post and a bearing k^4 for the reel-pivot, and in the other direction is thickened and set out from the board to afford a second bearing k^5 for the extreme inner end of said pivot-rod and a short stub-spindle k^6 for the dished gear-wheel below mentioned.

The reel-frame L is, as usual in modern harvesters, composed of two bars l, hinged to the supporting-posts by the pivot-rod l', and serving for the in and out adjustment according to their flexions upon the hinge, a yoke l^2 comprising two other bars hinged to the first pair, and serving as they fold thereupon or are raised therefrom to lift or lower said reel. The pivot-rod carrying the first pair of bars, and ultimately the whole reel-frame, is borne at its platform end in a short bracket rising from the corresponding reel-post and at its stubble end in the two bearings afforded by the casting K^2, and it receives between the two latter the long hub of a loose-running bevel-wheel l^3, which engages with and is driven by a bevel-pinion l^4, formed upon the inner face of a dished spur-wheel l^5, mounted on the stub-spindle from said strap-casting, and meshing with a pinion l^6 on the front end of the lower elevator-apron shaft or gudgeon at the head of said elevator and in advance of the wheel on said gudgeon which drives the upper apron. A sprocket-wheel m upon the pivotal gear receives a chain belt M, which runs to another sprocket-wheel m' upon the end of a shaft m^2, forming the pivot between the first and second pair of reel-supporting bars, and from the other end of the last-mentioned shaft a chain belt M′ connects, by chain-wheels m^3 m^4, with the reel-shaft m^5, borne, as above stated, in the outer end of the second pair of bars, so as to turn a reel of the usual construction.

To one of the bars serving for the in and out adjustment of the reel—preferably the bar on the grain side of the harvester—is fixed a

segment-bracket n, described on an arc concentric with the axis of said bar, and to that axis is pivoted a lever N, extending rearwardly within the reach of the driver's seat, which, as customary in my machines, is supported behind the elevator, although of course, disregarding the advantages gained thereby, its position may be changed. This lever has a small hand-lever near to its handhold connected by a link with a spring-dog engaging with the teeth of the rack, and at a point near said rack is connected by a link n' with a rearwardly-extending heel-piece from the yoke or one of the bars serving for the up and down adjustment of the reel, so that by raising or depressing the lever and locking it in position the height of the reel may be determined. If this latter lever alone were the instrumentality to secure the reel in position, it would, whether free from its rack or locked therein, only maintain the angle between the two sets of supporting-bars and the reel might drop by its own gravity. The lower set of supporting-bars—those for the in and out adjustment—must therefore be supported from the harvester-frame, and for this purpose they have attached to them keeper-plates n^2—one to each, with diagonally-set fingers—and are perforated behind the bars to receive the right-angled bent ends of tines n^3 from a forked brace bar or link N', extending to the rear of the elevator-float or overhung apron-frame, and there jointed to a lever N^2, which locks by means of its dog into a segment-rack n^4 upon the lower supporting-bar of said overhung frame or any other suitable base, the arrangement thereby serving to brace and hold the reel in fixed position and at the same time for its adjustment in and out.

To describe a little further, the keeper-plates and their fingers are attached to the respective bars of the lower pair so that the fingers project on the same side of each, and the bent ends of the forked brace may be inserted into their sockets, while the rear part of the brace is elevated and not connected with its lever without interference from the fingers; but immediately after being so inserted the brace is to be carried down, bringing its arms or tines inside the fingers, which will restrain them from leaving the sockets, and the brace will then be secured to the lever at its rear end, as above explained.

The front sill O of the platform-frame, forming usually part of the finger-bar, extends as to its length in the same direction and to the same extent as heretofore; but to raise the butts of the grain over the elevator, which butts have often been delayed by their contact with the finger-bar, both lower and upper elevator-aprons are advanced in front of the platform-apron. Were the front sill of the same dimensions throughout, the lower elevator-apron must be raised at its foot to a level with the top surface of the platform-apron, and grain might escape between the two. To avoid this the wooden front sill is recessed or hollowed on the inner side of the platform-apron to admit the lower roller and bight of said lower elevator-apron, and that it may not be weakened by such loss of material a casting O' is bolted thereto along the inner side and provided with a flange o, supporting the bottom of said sill just beneath the cut-away portion, and a second cupped flange o', entering and lodging upon the cut-away portion, strengthening and guarding against splintering or wear from contact with the belt.

In the use of canvas aprons or belts a great drawback is encountered in the difficulty of keeping them in proper alignment with their driving rolls or drums. This difficulty is particularly marked in the use of the platform-apron, and is due to several causes—as the twisting of the platform, the unequal tightening of the straps by which its ends are united, and the unequal wetting and consequent unequal shrinking by wet grain. These all induce the apron to run sidewise or toward one end of the driving roll or drum, and as the upper fold of the platform-apron approaching its driving-roll is necessarily unguided by a wall or fence against which its edge may abut, it not unfrequently is so far out of alignment when it reaches the roll as to catch on the cutter-bar or rear sill, or whatever else bounds its return passage, and so to be stopped, blocking the entire harvester.

After a portion of the apron, say the forward end, has entered upon its driving-roll out of proper alignment, it is usually found, owing to the tension of the apron, impossible to slide it endwise of the roll into its proper position. To avoid this serious difficulty, I employ an inclined guide or cam o^2, against which the ends of the cross-slats on the apron strike just before they enter upon the driving-roll, and by which they are driven back, if out of alignment, so as to enter squarely on the roll. This guide is most needed at the forward edge of the apron next to the cutter-bar, as, owing to the fact that the forward side of the canvas is often made quite wet and so unduly taut, while the rear side is dry and comparatively loose, and also owing to other causes, as the inclination forward of the platform, the tendency of the apron is to run off of the forward end of its driving-roll; but preferably I provide the rear as well as the forward edge with such guide o^2 and locate the two guides just in advance of the roll, so as to adjust the apron before it enters and becomes rigid over the roll. The forward guide on my machine it is preferred to make a part of the above-mentioned casting O', forming it as a raised and inclined guiding-flange thereof.

Just beyond the depression in the front sill, on the stubble side thereof, is a bracket P, having a channel p to guide the heel of the cutter-bar P', and inside of said channel a

ledge p' of sufficient space to admit the thickness of the pitman P^2, which at its end is bent at right angles, so as to enter a socket in said heel, in which it will be retained by the vertical web p^2 of the bracket until such time as it is released from its crank-pin and the cutter-bar drawn out of the bracket.

In recent times the finger-bar has almost invariably been constructed of angle-iron with a wood backing, the guard-fingers being bolted to the upper horizontal flange of said angle-iron. This is an expensive and inconvenient construction, and I have discarded it, and, preferably, all other metallic bars, choosing to utilize the wooden front sill as the main support of the guard-fingers, which is done in the following manner: To the rear of this front sill is applied a bar q, serving as the ordinary guide-bar for the support of the apron-edge, and in front of the sill opposite the first-named bar is placed a second bar or strip q', secured advisably by through-bolts, binding all three together.

The sill and front bar are beveled forwardly, as shown, to facilitate the reception of grain. Beneath the front bar and close to its edge the sill O is bored horizontally with a series of sockets or holes q^2, and the guard-fingers R are formed with spindular shanks r, which enter said recesses or sockets. Bolts r' pass vertically through the front bar and enter into the shanks of the guard-fingers, to which they are attached by nuts, thus completing the fastening. Otherwise the guard-fingers are of the usual form. The back of the cutter-bar in this connection is retained, and plays against clips or keepers r^2, which consist, individually, of an irregular T-casting, so shaped and applied that the extremities of the short arms are secured by two adjacent guard-finger-fastening bolts, and the long arm rises between these respective guard-fingers, sits firmly against the face of the front strip to receive the backward thrust of said cutter-bar, and bends forward snugly over its top to prevent its escape. Such keepers will be applied at regular intervals, but need not correspond in number with the number of spaces between the guard-fingers.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, of the elevator-float or upper apron-frame overhung from the front of the machine, and a latch or removable support bracing said frame at the rear of the elevator and adapted to be thrown out of the way in reaping long grain to leave a clear passage through which its heads may project.

2. The combination, substantially as hereinbefore set forth, of the elevator-float or upper apron-frame overhung from the front of the machine, the pin upon the rear bar of said frame, and the pivoted latch upon the rear inner strut of the elevator-frame.

3. The combination, with a carrier-apron, of a cam arranged near its delivery end to prevent or correct lateral shifting.

4. The combination, with a platform-apron and with the roller at its delivery end, of a cam projecting up from the front sill in advance of said roller to prevent or correct lateral shifting over the finger-bar.

5. The combination, with a platform-apron and with the roller at its delivery end, of cams arranged upon the front and rear sill in advance of said roller, for the purpose set forth.

6. The combination, substantially as hereinbefore set forth, of the pinion on the front gudgeon of the driving-roller at the head of the lower elevator-apron, the gear-wheel intermeshing therewith, the bevel-pinion on the inner face of said wheel, the bevel-gear meshing with said pinion and having its axis coincident with the axis of the primary reel-supporting frame, the chain belt running from a sprocket-wheel on the hub of said gear to a sprocket-wheel upon a shaft forming the pivot between the two reel-frames, and the second chain belt running from a sprocket-wheel upon said pivotal shaft to a sprocket-wheel upon the reel-shaft to drive said reel.

7. The combination, substantially as hereinbefore set forth, of the double-jointed reel-supporting frame, the forked brace-link having the ends of its tines turned at right angles to enter sockets in the two bars of the inner frame, the hooked keepers to retain said tines in their sockets, and the lever to which said link is pivoted at its shank end.

8. The combination, substantially as hereinbefore set forth, of the double-jointed reel-supporting frame, the lever pivoted at the axial point of the inner section of said frame, the segment-rack bolted to one of the arms of said inner section and into which the lever latches, and the link extending from the lever to a heel-extension from the outer section.

9. The combination, substantially as hereinbefore set forth, of the double-jointed reel-supporting frame, the lever pivoted at the axial point of the inner section of said frame, the segment-rack bolted to said inner section and into which the lever latches, the link extending from the lever to a heel projection from the outer section, and the forked brace connected to said inner section, and the lever to which said brace is jointed, whereby the reel may be adjusted up and down and in and out by manipulating said levers.

10. The combination, substantially as hereinbefore set forth, of the draft-tongue hinged to the frame beneath the elevator, the elbow-lever pivoted to the frame-work above said tongue, the link extending from the outer arm of said lever to the tongue, the crank-rod collared in a bearing at the rear of the elevator and running longitudinally therebeneath, and the swiveled nut in the power-arm of the elbow-lever, into which the screw-threaded end of said crank-rod takes.

11. The combination, substantially as here-

inbefore set forth, to form a finger-bar, of the wooden sill having a series of horizontal sockets bored therein, the guard-fingers, of malleable metal, having diminished tangs to enter said sockets, the strip bolted to the sill above said guard-fingers in advance of the sockets, and the bolts passing vertically through said strip into the guard-fingers beneath and completing their fastening.

12. The combination, substantially as hereinbefore set forth, of the wooden front sill having sockets, as described, the guard-fingers formed with tangs to enter said sockets, the supporting-strip for the front edge of the platform-apron laid along the rear of said sill, the second strip laid along its front above the guard-fingers and resting thereon, the horizontal bolts passing through both strips and the intermediate sill and binding them together, and the vertical bolts passing through the front strip and into the guard-fingers and completing their fastening.

13. The finger-bar formed, as described, of a wooden sill having a series of horizontal sockets, a wooden strip attached to its front face just above the line of said sockets, and, together with the sill, beveled along the top in the line of advance of the machine, and the guard-fingers formed with tangs, which are driven into said sockets, and receiving vertical bolts from the overlying strip to complete the fastening.

14. The combination, in a finger-bar, of a wooden sill having a series of horizontal sockets, a wooden strip attached to its front face just above the line of the sockets, guard-fingers formed with tangs which are driven into said sockets, vertical bolts passing through the front strip into each guard-finger to complete their fastening, and clips or keepers secured by adjacent two of said bolts and rising between their respective guard-fingers to receive the rearward thrust of the cutter-bar and secure it against escape.

15. The combination, substantially as hereinbefore set forth, of the lower elevator-apron projecting in front of the platform-apron and the front sill recessed or hollowed out beneath said elevator-apron to bring it down close to the platform-apron.

16. The combination, substantially as hereinbefore set forth, of the lower elevator-apron projecting in front of the platform-apron, the front sill recessed or cupped to admit the lower bight of said elevator-apron and bring it close to the platform-apron, and the metal binding-plate shaped to conform to the front sill at this point and strengthen it.

17. The casting or binding-plate O′, formed as a strap for application to the rear of the front sill, with a cup projection to enter the curved recess in said sill, and with a supporting-flange embracing the bottom of the sill immediately beneath said recess.

18. The casting or binding-plate O′, formed as a strap for application to the rear of the front sill, with a cup projection to fadge upon the curved recess in the top of said sill, with a flange to embrace the bottom beneath said recess, and with a vertical guard pin or finger to prevent lateral slip of the platform-belt.

19. The strap or casting binding the two sections of the rear sill together at the base of the elevator, and formed with a flange or seat thereon, as described, in combination with the hood and bearing-piece fitting to said flanged seat and secured to the casting by a single bolt.

20. The combination, substantially as hereinbefore set forth, with the lateral shaft at the rear of the machine and with the beveled gearing between said shaft and the platform-apron roller, of the bearing for the end of said shaft on the grain side of the apron-roller, and the hood covering the bevel-gearing between the two.

21. The casting formed with a bearing for the rear gudgeon of the roller at the head of the lower elevator-apron, laterally-projecting straps to be bolted to the rear struts of the elevator-frame to bind said struts together, and a hood to shield the beveled gearing by which said roller is driven.

22. The casting formed, substantially as described, with a bearing for the rear gudgeon of the roller at the head of the lower elevator-apron, a bed for the reception of the upper end of the shaft by which said roller is driven, a hood to shield the bevel-gearing between said shaft and roller, and laterally-projecting straps or arms to bind the elevator-struts together.

23. The casting formed, substantially as described, with a bearing for the horizontal driving-shaft extending rearwardly beneath the elevator, a second vertically-trending bearing for the upright shaft which drives the elevator-apron, and a third horizontally-trending bearing for the lateral shaft which drives the platform-apron.

24. The casting formed, substantially as described, with the three bearings combined with the segment-rack for the change-speed lever bolted to a standard on the said casting.

25. The bridge-casting formed, substantially as described, with a sleeve-bearing for the cutter crank-shaft, a second bearing for the end of the change-speed shaft, and supporting-eyes for the proximate ends of the guard-rods which support the binder-frame.

26. The bridge-casting formed, substantially as described, with a bearing for the front end of the apron-driving shaft, a second bearing for the change-speed shaft, and an eye for the support of the rear end of the hindmost guide-rod for the binder-frame.

27. The casting K′, formed, substantially as described, with a flange bolted to one of the reel-supporting posts, a second flange bolted to the cross-piece of the elevator-frame, and a third flange affording a seat for the brace-rod running to the nose of the inner divider, and bolted to the front inner elevator-strut.

28. The strap-casting K^2, formed, substantially as described, with bearings for the pivot-rod which forms the joint between the reel-supporting frame and the reel-posts, a stud-spindle for the spur and bevel wheel which drives the axial gear of the reel, and shaped as to its body portion so as to be bolted to the front board of the elevator-frame and embrace the adjacent reel-post and be bolted thereto.

29. The crossed brace-bars in the outer descending portion of the elevator-frame, combined with the supporting-bar for the inner edge of the binding-table, bolted to said brace-bars at their intersection and to the outer struts at its ends.

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Witnesses:
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