(No Model.)

4 Sheets—Sheet 1.

S. D. LOCKE.

HARVESTER.

No. 339,561. Patented Apr. 6, 1886.

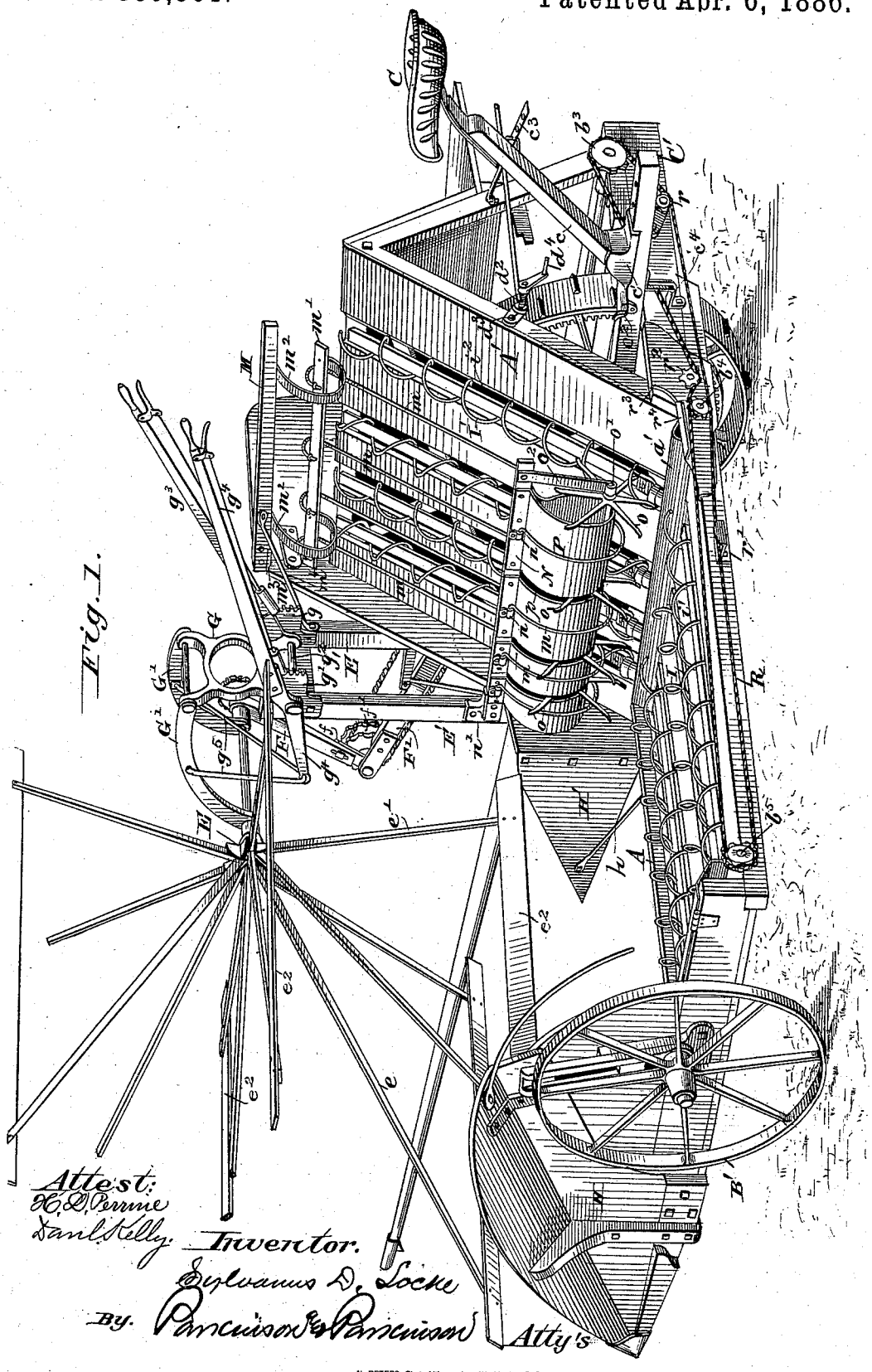


Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

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HARVESTER.

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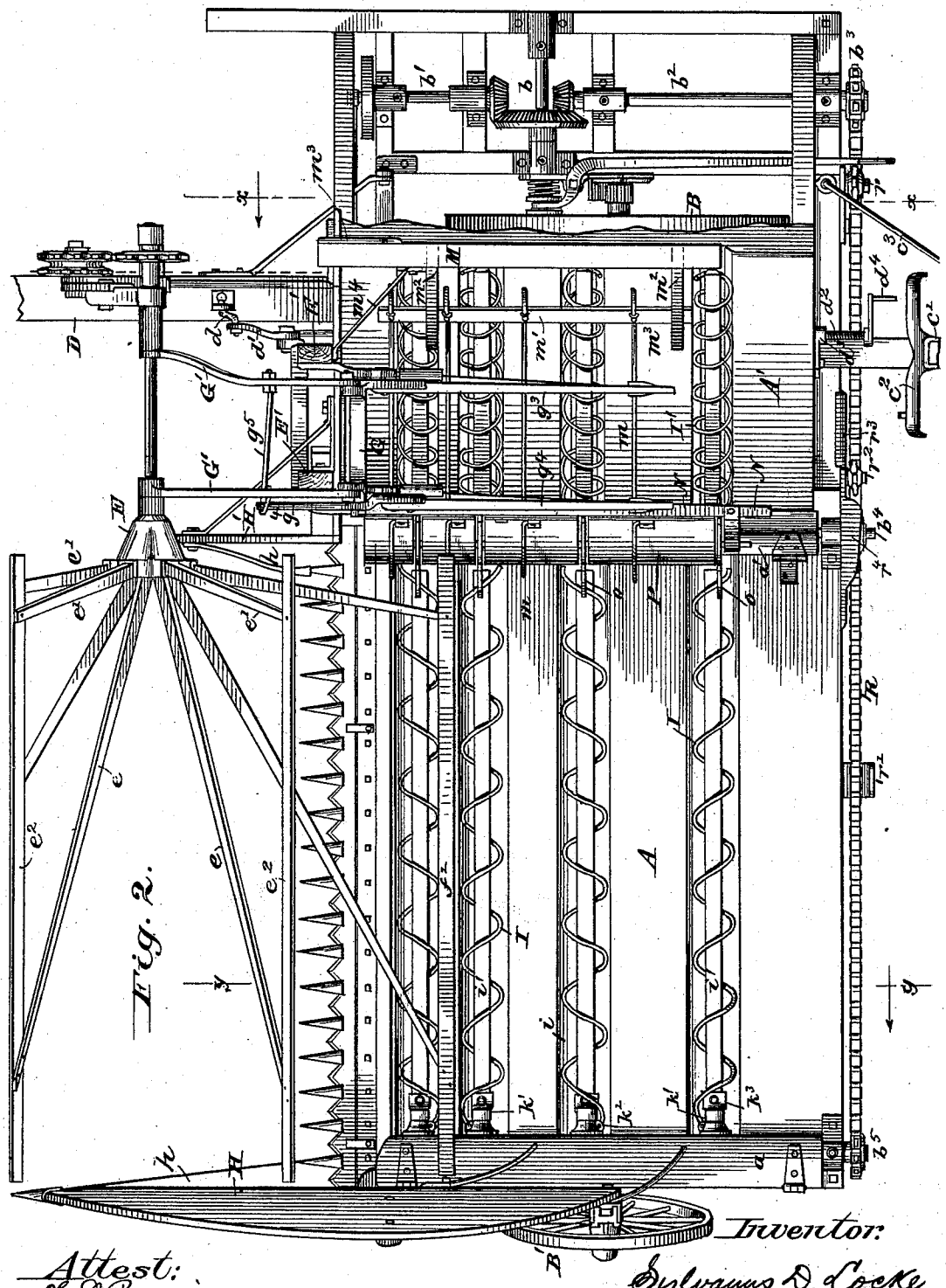


Fig. 2.

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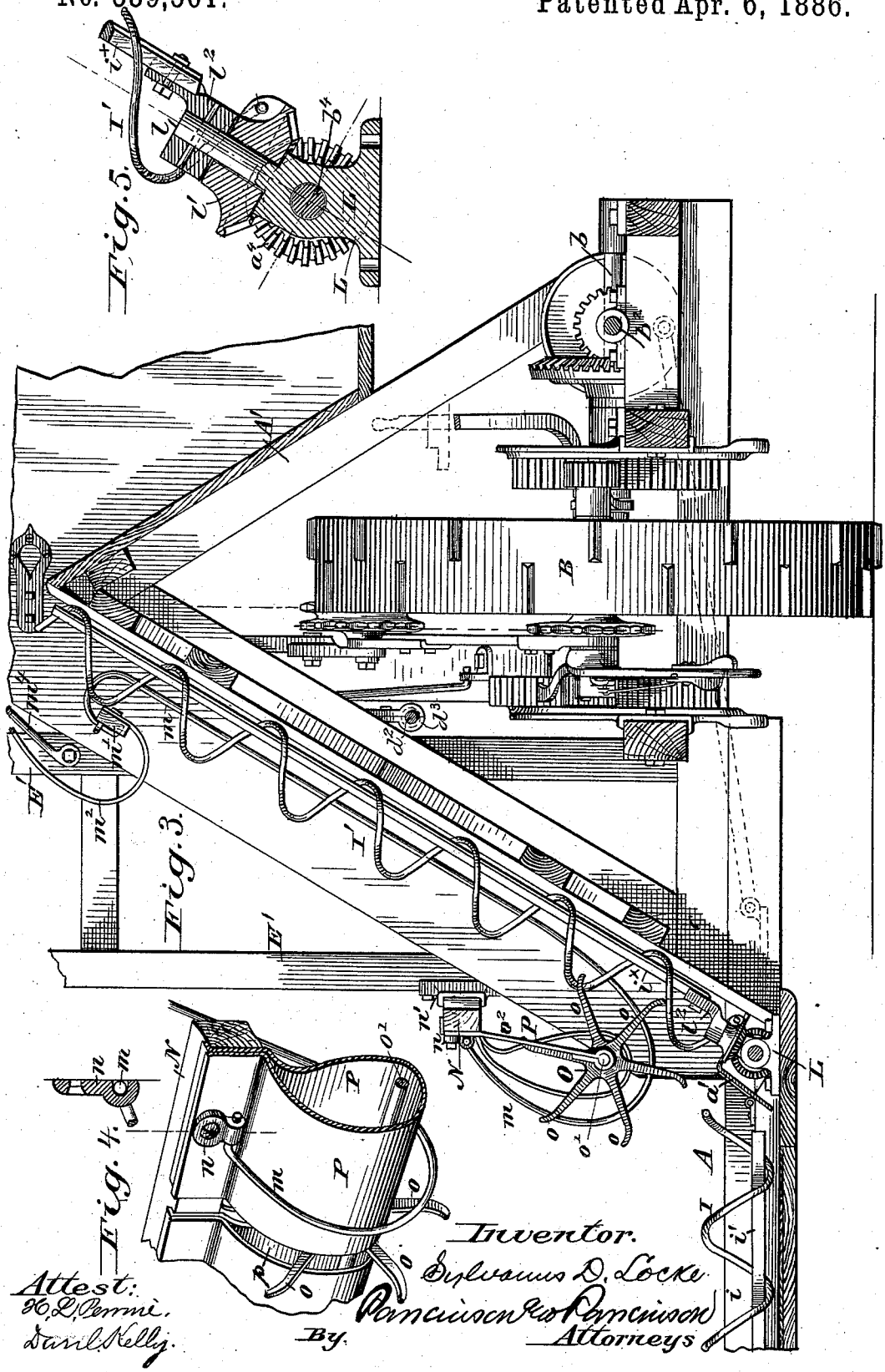


Fig. 5.

Fig. 3.

Fig. 4.

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4 Sheets—Sheet 4.

S. D. LOCKE.

HARVESTER.

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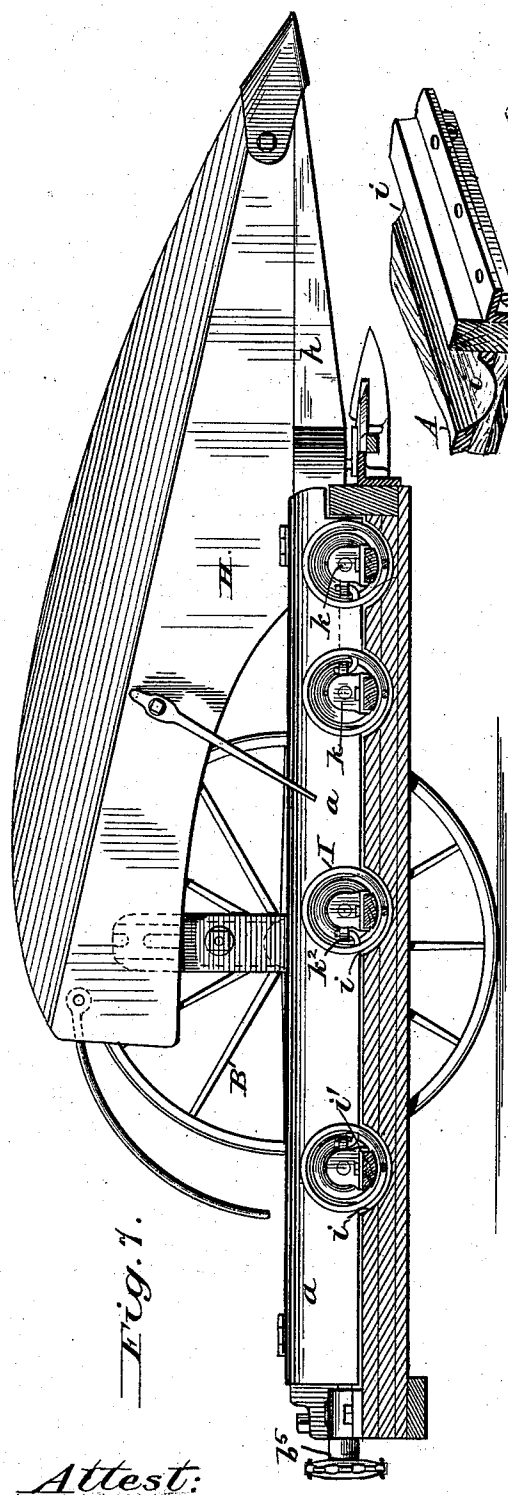


Fig. 1.

Fig. 9.

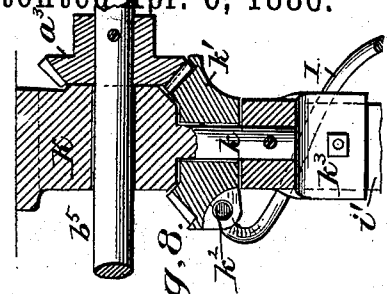


Fig. 8.

Fig. 6.

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UNITED STATES PATENT OFFICE.

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

HARVESTER.

SPECIFICATION forming part of Letters Patent No. 339,561, dated April 6, 1886.

Application filed March 16, 1881. Serial No. 2[illegible],409. (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.

My invention relates, mainly, to that class of harvesting-machines in which the grain, after being cut or laid upon the platform, is carried sidewise by raking apparatus up over an elevator, as in the well-known Marsh type, and delivered to a binding-table or to an automatic binder or dropped upon the ground; and for the purpose of properly illustrating the various features I have represented them in connection with a machine of such construction.

My improvements consist in a raking mechanism composed of rotating spirals braced by exterior supports; in the combination, with rotating raking spirals braced by exterior supports, of independent internal supports; in the combination, with an elevator composed of rotating spirals, of a series of rotating star-wheels, to insure the proper delivery of grain from the rake thereto; in a spring-supported float overlying the elevator and sustained in a peculiar manner, and in other combinations and details of construction hereinafter described.

In the drawings, Figure 1 is a perspective view of a machine embodying my improvements. Fig. 2 is a top plan view; Fig. 3, a vertical section through the elevator longitudinally of the machine; Fig. 4, details of the float and forcing-wheel at the junction of the platform and elevator-rakes; Fig. 5, a detail of the gearing by which the elevator-rake is driven; Fig. 6, enlarged plan view of the outer end of the platform, with parts removed to show the rake-gearing; Fig. 7, a vertical section through the platform on the line *y y*, Fig. 2; Fig. 8, a detail of the gearing which drives the platform-rake, and Fig. 9 a detail of the finger-bar and adjacent part of the platform.

The machine consists, primarily, of a platform, A, at the forward edge of which is arranged a sickle-bar or cutter, and upon which the grain falls as cut thereby, an elevator-frame, A′, rising from the platform to a point above the main drive-wheel, and thence extending down on the opposite side, two supporting-wheels, B and B′, the former of which carries the principal weight of the machine and serves as the driving-wheel from which motion is transmitted to the operating parts of the machine and the latter being the grain-wheel, and a strong frame supporting the apparatus on the axle of the drive-wheel.

For the purpose of varying the height of cut, the machine is vertically adjustable upon the axle of the main or driving wheel, as is usual in machines of this class, the outer supporting-wheel being likewise adjustable, in order to maintain the platform in a horizontal position.

The mechanism which I prefer to use for raising and lowering the machine is represented in Fig. 3, the axle being furnished with pinions meshing into segmental racks, a lever being provided for rotating the pinions, and suitable detents being employed for holding the pinions against rotation after adjustment, as in Letters Patent granted to me bearing date January 11, 1881, and numbered 236,503, to which reference is made for a more full description.

The seat C is for the purposes of the present description shown as mounted upon the rearwardly-projecting beam C′, which runs longitudinally beneath the elevator-frame, the standard *c* of said seat being seated in a casting, *c′*, which is adjustable forward and backward upon the beam, and is held at any desired adjustment by means of a bolt passing through the step or casting and through one of a series of holes in the beam. The step is formed with an inclined socket to receive the seat-standard, and with a foot-rest, c^2, to receive the feet of the driver. The standard may be bolted in the socket, but ordinarily its leverage will be sufficient to confine it therein, and for the purpose of staying it when so confined, and to permit its ready removal or adjustment, a rod, c^3, is provided, having its inner end bent to hook into an eye or staple on the frame of the machine, and having a series of perforations at its outer end to receive a hook or pin on the seat-standard, bent at such angle that after the rod has been applied thereto and hooked into its eye on the frame it cannot be removed without first releasing it from said eye.

In order to brace the overhanging rear end

of the beam C, and also to provide a guide or keeper for the driving-chain, as will hereinafter appear, I make use of an angular bracket, c^4, bolted by one foot to the rear sill of the frame and by the other to said beam.

The draft-tongue D is hinged or jointed to the sills of the elevator-frame, as usual, and is connected at a suitable distance from the said joint by a link, d, with one arm of an elbow-lever, d', the other arm of which is coupled by a ball-and-socket or equivalent joint to the forward end of a rod or shaft, d^2, which is threaded at its rear end, passes through an internally-threaded arm, d^3, and is provided within reach of the driver's seat with a crank, d^4, or a hand-wheel, by which to turn it. The rotation of the rod or shaft causes it to move forward or backward, thereby rocking the elbow-lever upon its pivot and causing it to elevate or depress the link, and through it the tongue, according to the direction in which the rod or shaft turns. A reel is also employed, which may be summarily described as consisting of a hub, E, attached to the usual reel-shaft and carrying diagonal braces e and radial hangers e', which support the outer and inner ends, respectively, of beaters e^2, extending practically from end to end of the cutter-bar.

E' E' represent two uprights or standards at the front of the elevator, bearing near their tops, firmly bolted, two segmental racks, g and g', between and through which extends a horizontal rod or shaft, g^2. Upon this rod is mounted a yoke, G, having pivoted or jointed to its upper ends a frame or arms, G', supporting the reel-shaft, as shown. The yoke is furnished with a hand-lever, g^3, by which it may be rocked upon the rod or shaft g^2 in order to throw its upper end outward or inward, and thereby throw the reel-shaft forward or draw it back, causing the reel to stand in advance or in rear of the cutter or at any intermediate point. The lever has a locking-dog to engage with the rack g, for the purpose of holding the yoke in its adjusted position, which dog is connected by a rod or wire with a hand-piece alongside the hand-hold of the lever, that may be grasped and operated to disengage the dog in the act of seizing the lever.

For the purpose of varying the elevation of the reel a second lever, g^4, is pivoted upon the rod or shaft g^2, with its forward end extending some distance in advance of the yoke G, and there connected by a link or rod, g^5, with both of the reel-supporting arms G', as more clearly shown in Fig. 1, so that by rocking said lever upon its pivot the link is moved up or down, carrying the arms G' with it, the arms swinging on the rod by which they are jointed to the yoke. This last lever is furnished with a locking-dog in the same manner as the other, to engage with rack g' and hold the lever and and reel when adjusted. The two levers extend backward, so as to bring their hand-holds within easy reach of the driver.

The reel-shaft is connected by a bar, F, and adjustable plate f with a radius bar, F', centered on the driving-wheel axle, and carrying at its outer end a double chain-wheel, f', and motion is transmitted by means of a chain-belt from a chain-wheel on the driving-axle to the wheel f', and thence to a wheel on the reel-shaft. A single chain-belt may, however, be used by making the usual provisions therefor.

The mechanism relating to the support and adjustment of the seat, that relating to the adjustment of the draft-tongue and its co-operation with the seat, and that relating to the individual adjustment of the reel, as well as the specific construction of said reel, are made the subject-matters of applications filed as divisions of the present, and entitled Division B, relating especially to the seat, filed January 28, 1886, Serial No. 190,046; Division C, relating to the draft-tongue, filed on the same date, Serial No. 190,045, and Division D, relating especially to the reel, also filed on said date, Serial No. 190,074, and to these respective divisions reference may be made for more extended and particular description of said devices, their constituent mechanism, and their purposes.

Hitherto it has been customary to employ dividing-boards inclined in relation to the line of advance of the machine, or curved at the outer end, for the purpose of more effectively gathering and drawing in leaning grain. It is, however, found in practice that such construction is objectionable, as the ends of the reel-beaters have to be shortened or kept back to avoid coming in contact with the dividers, and the grain is thereby frequently permitted to escape, and is in consequence bent or broken down and swept under the machine without being cut by the knife or sickle. To overcome this difficulty, and to insure a clean division and certainty of reeling the grain into the cutters, I employ straight inside and outside dividing-boards, H H', especially the latter. The former may have the usual inclination, extending directly forward in the direction in which the machine advances, so that the reel-beaters may sink and move between them in lines parallel with their faces. Wings or flanges h project inwardly along the feet of these dividing-boards, so as to lift the grain away from contact with their walls, and the ends of the reel-beaters project beyond and sweep close over these flanges as they pass back in their beating movement. This construction requires less draft-power than the old, insures less waste, a much cleaner stubble, and otherwise gives very beneficial results.

The raking mechanism by which the cut grain is carried sidewise over the platform, and, in the present instance, delivered to the elevator, consists of a series of spirals, I, each attached at one end to a rotating head or pinion, while its delivery end is left free and disconnected entirely from other parts in order

to insure a free and unobstructed delivery. To this extent the raking mechanism is essentially the same as that for which Letters Patent were granted to myself and Egbert Bowhay, bearing date April 29, 1879, and numbered 214,929, upon which this is an improvement.

The platform is formed with longitudinal concave channels *i*, conforming nearly to the periphery of the spirals. These channels receive the spirals, and, being of like curvature in cross-section, serve both to support and keep them in shape and to prevent their moving out of place. In order the more certainly to retain the spirals in the channels and prevent their rising, I apply internal bars, *i'*, the lower face of said bars being rounded to correspond to the internal curvature of the spirals. To provide against the grain being carried to or from the cutter by the rotation of the spirals, the latter are coiled alternately in right and left hand directions and geared to rotate in a corresponding manner, as before.

In Fig. 6 the gearing by which the raking mechanism is driven is represented, and in Fig. 8 the construction of parts and the arrangement of gearing is shown enlarged and in detail.

K represents a supporting-block, which is bolted to the frame at the end of the platform, and is provided at its outer end with a spindle, *k*, which forms an axle for the pinion or head *k'* of the spiral I, the end of which is seated and secured in a socket in a lug, k^2, formed on said pinion. The block is also formed with a transverse hole or bearing to receive the driving-shaft b^5, carrying the series of driving-pinions a^3, the end and side faces of the block serving as bearing-surfaces for the pinions, as indicated. Outside of the pinion *k'*, and upon the spindle *k*, is pinned or otherwise firmly secured a block, k^3, flanged at its sides and adapted to receive and support the end of the bar or internal brace, *i'*, which is secured thereto by a bolt or equivalent fastening, as shown. In this way the block k^3 is very firmly supported, and is at the same time made to hold the pinion in place upon the spindle.

The driving-shaft b^5 extends across the end of the platform from the forward spiral slightly to the rear of the platform, where it is furnished with a sprocket-wheel, by which it is driven, and its whole length within the platform, and with it the gearing, which it immediately supports and drives, is covered by a cap, *a*, suitably beveled, to deflect the grain upon the raking or conveying mechanism, and hinged that it may be thrown back to give access to said gearing to permit oiling or repairs. From the raking mechanism the grain is delivered to the lower end of the elevator, which is of a construction similar to that of the platform-raking mechanism, consisting of a series of spirals, I', with internal bars, $i^\times$, as in said rake.

The gearing for driving the elevator-spindles is essentially the same as that used for driving the first or raking spirals, and is represented in detail in Fig. 5, L representing a block, a series of which are bolted to the platform, each perforated to receive the shaft b^4, carrying the driving-pinions a^4, which impart motion to the pinions *l'* of the spirals, rotating about the spindles *l* of the block, and held in place thereon by the block l^2, to which are secured the bars $i^\times$. The shaft b^4, like its companion shaft at the outer end of the platform, is provided with a sprocket-wheel at the rear of the machine, whereby it may be driven, and with its immediate gearing is covered or incased by a hinged cap, *a'*, which also forms a bridge between the platform and elevator-spirals.

Instead of forming concave channels in the elevator-platform or covering of the elevator-frame, the spirals I' may be placed over openings i^2, extending from the top to the bottom thereof and of a width less than the diameter of the spirals, the sides of said openings being beveled or chamfered to support the spirals and prevent their cutting into the covering of the frame. While this construction is an improvement over previous plans, and may be used with advantage both for the elevator and raking mechanism, the concave channels are deemed more advantageous, for the reason that they give a better support to the spirals, and also prevent the loss of grain, which is liable to occur when the bottom of the channel is open.

To hold the grain properly down to the elevator-spirals and insure its being carried upward thereby, I employ a float sustained by overhanging arms M and N, in substantially the same manner as in the patent heretofore granted to me, bearing date October 26, 1880, and numbered 233,781, whereby the grain is permitted to extend outward beyond the float at the back of the machine. Instead, however, of an endless apron, as in the patent mentioned, I make use of a series of elastically-yielding rods, *m*, attached at their lower extremities to the bar N and at their upper end to a bar or slat, *m'*, which is in turn suspended by spring arms or supports m^2 from the bar or beam M. This construction causes the rods to bear with sufficient force upon the grain to insure the proper action of the spirals upon it, even when but little is passing, and at the same time permits them to yield to accommodate an unusually large quantity of grain without undue pressure.

For the purpose of permitting the float to swing back at the upper end without the necessity of unduly springing the rods of which it is formed, said rods are bent laterally at a right angle at their lower extremities, and passed loosely through or under clips *n*, screwed fast or otherwise secured to the bar or beam N, as shown in Fig. 4. This arrange-

ment forms a hinge-joint or pivotal attachment, enabling the float to move freely to or from the elevator platform or frame.

The beam or bar M, which bears the upper end of the float, is supported by a bracket, m^3, at the head of the elevator, and braced by a rod, m^4, or in any equivalent manner, and the lower bearing-beam, N, is firmly bolted to a flanged casting, n', attached to the post or standard E', by which it is held rigidly in place.

For the purpose of facilitating and insuring the passage of the grain from the raking-spirals to those of the elevator and its proper delivery to the latter, a series of star-wheels, O, is employed, each consisting of a series of radial arms, o, having their ends curved slightly backward, as shown in Figs. 3 and 4, and mounted and secured upon a common shaft, o', suspended from the beam N in hangers o^2, directly over the space intervening between the raking and elevator-spirals in position to carry the grain from one to the other. A rotary motion is imparted to the star-wheels and shaft by the successive engagement and elevation of the arms of one or more of said wheels by one or more of the elevator-spirals. In order that the grain may not be wound or twisted about the shaft, a shield, P, of sheet metal or other suitable material, is placed thereabout, having openings p, through which the arms o extend, the curved lower ends of rods m serving also to hold the grain away from said shaft, and to strip it from the fingers as they revolve.

While I have described the star-wheels as fixed upon the shaft, and prefer to arrange them in such manner, in order to insure an equal advance of the grain at both ends, it will be seen that good results may be attained by mounting them loosely upon the shaft and rotating each one as an individual, particularly as the spirals are caused to move in unison.

The grain carried up over the elevator is delivered to a binding-table, an automatic binder, or allowed to fall upon the ground, as is usual in such machines.

Heretofore it has been usual to place the sprocket-wheel and shaft for driving the platform-rake at the junction of the platform and elevator, and for driving the elevator-rake at the head or apex of the elevator, and to lead a chain over them from a master-wheel at the rear outer corner of the latter. This involves a constantly-moving body over parts liable to be touched by the hand or person of the driver or other attendant, and is therefore objectionable.

In my machine I arrange the shaft b^4 for driving the elevator-rake at the angle between the platform and the elevator, the shaft b^5 for driving the platform-rake at the outer end of the platform, and their sprocket-wheels immediately outside of the rear sill of the machine, and drive them by a horizontal endless belt, R, running behind said sill from the master-wheel b^3 at the outer base of the elevator. From this wheel the belt is led over a tightener, r; thence to and beneath the sprocket-wheel on the end of the shaft b^4; next over a support, r', about midway of the length of the platform, which may also serve to hold it up in mesh with said sprocket-wheel; then over the sprocket-wheel at the outer end of the platform, and returned over the sprocket-wheel at the inner end, down under an idler, r^2, to bind it to said wheel, and, finally, through the keeper c^4 to the master-wheel again.

In order to brace and strengthen the joint between the platform and elevator, and also to protect the chain at that point and provide firm bearings for the sprocket-wheel and idler, whereby they may be kept in constant relation to each other, I apply a casting, r^3, which binds the frame at said point, receives the journals of the idler and sprocket-wheel, and bridges, by means of an overhanging flange, r^4, the chain above and for some distance to the side of the wheel, so that it will not be clogged.

Ordinarily, the master-wheel b^3 is keyed to a shaft extending through the machine from front to rear, and bearing at its forward end the crank-wheel by which the cutter-bar is driven. The relative speeds of cutting and raking mechanism are therefore determined by the size of the exposed wheels at either end of the shaft. In the present instance it is shown as divided, so that the bevel-gear on the end of the shaft b, driven direct from the main wheel, may mesh with bevel-pinions on the inner ends of said shaft-sections b' b^2, the former bearing the crank-wheel at its front end and the latter the master-wheel b^3 at its rear. This arrangement is advantageous when automatic binding mechanism is to be driven from the section b^2, as the pinion of the latter may, as proposed in an application filed by me in the Patent Office of the United States on the 29th day of March, 1881, Serial No. 29,452, be meshed with an inner or narrower rim of teeth on the face of its driving-gear, and thereby be driven with greatest power, while the pinion of the crank-shaft may run on an outer rim for speed.

I claim—

1. In combination with a harvester-platform having concave channels in its face, revolving spirals seated in and supported by said channels, as and for the purpose set forth.

2. In a raking or conveying mechanism, a series of channels or openings in a carrying-table having their sides beveled or curved, combined with a series of revolving spirals seated in said channels or openings, and sustained by the sides thereof, with their crests above the plane of the table.

3. In combination with a revolving spiral seated in a sustaining-channel, an internal bar to prevent the spiral from rising from said channel.

4. In combination with a raking or conveying spiral, a pinion provided with a perforated lug to receive the end of said spiral.

5. In a raking or conveying mechanism, substantially such as described, a supporting-block provided with a transverse opening to receive the driving-shaft and with a spindle to receive the driven pinion.

6. In a raking or conveying mechanism, substantially such as described, the combination of a block provided with a spindle, a pinion or head located on said spindle and carrying a revolving spiral, and a block or casting secured upon the spindle outside of the pinion and serving to retain the same in place, and also to support a bar or slat extending longitudinally through the spiral, as set forth.

7. In combination with a revolving spiral conveyer, an internal bar and a flanged block or bracket for supporting said bar, substantially as shown and described.

8. In a raking or conveying mechanism, a series of perforated blocks supporting a driving-shaft, a series of pinions secured upon said shaft and bearing against the face of the block, and a series of pinions mounted upon spindles projecting from said blocks, meshing with the pinions of the shaft, and provided with conveying or raking spirals, as set forth.

9. The combination, in a conveying mechanism, of block L, provided with spindle l, shaft b^4, passing through said block and provided with pinion a^4, pinion l', mounted upon the spindle, carrying spiral I′ and meshing with pinion a^4, and a block or bracket, l^2, secured upon the spindle and serving to support the bar $i^\times$, as shown.

10. In combination with the platform and elevator rakes, the cap covering the gearing at their intersection and forming a bridge over which the grain passes from one rake to the other.

11. In combination with gearing located at the foot of the elevator for imparting motion thereto, a hinged shield or guard placed over said gearing, to protect it from the grain and permit access thereto, and also forming a bridge between the platform and elevator rakes.

12. In combination with independent raking and elevating mechanisms placed end to end and a shield or bridge closing the gap between them, rotating star-wheels overlying the passage-way for the grain above said bridge and at the meeting point of said raking and elevating mechanism, to assist and regulate the grain in its passage from the surface of the former to the surface of the latter.

13. In combination with a spiral grain-conveyer, a star-wheel located at the receiving end of the conveyer, to assist the grain in entering the same, and rotated by the engagement of the spiral with its arms, as set forth.

14. In combination with an elevating mechanism, an overlying toothed wheel mounted upon a shaft above the base of said elevator and arranged to assist in delivering the grain thereto, and upwardly-extending float-rods pressing upon the grain and curved eccentrically to the axis of the wheel to strip the grain therefrom.

15. In combination with an elevating mechanism, an overlying toothed wheel mounted upon a shaft above the base of said elevator, to assist in delivering the grain thereto, a slotted guard or shield inclosing the shaft of said wheel, to prevent grain from coming in contact therewith, and float-rods exterior to the guard and eccentric to the axis of the wheel, to strip the grain from the teeth.

16. In combination with a grain-elevating mechanism, an overlying float suspended from an overhead support by elastic arms at its upper end, whereby it is permitted to adapt itself to varying quantities of grain.

17. In combination with grain-elevating mechanism, an overlying float hinged or jointed at its lower end and sustained by elastic arms at its upper end, as and for the purpose set forth.

18. In combination with grain-elevating mechanism consisting of a series of rotating spirals, an overlying float consisting of a series of rods placed between the spirals and connected at their upper extremities with a spring-sustained head or bar.

19. In combination with grain-elevating mechanism consisting of a series of revolving spirals, a series of presser-rods placed alternately between the spirals, to hold the grain properly upon the spirals, as set forth.

20. In combination with grain-elevating mechanism, a series of presser-rods overlying the same and individually pivoted or jointed at their lower ends, whereby they are permitted to move back independently one of another to accommodate large quantities of grain.

21. In combination with a rod, m, of the float, having its end bent laterally, as described, a clip, n', adapted to fit over said end and retain it in position, while at the same time allowing it to turn therein.

22. In a harvester, the combination of an inner and an outer divider, both extending forward in a plane parallel with the line of advance of the machine, and provided along their feet with inwardly-extending wings or flanges.

23. The combination, in a harvester, of dividers extending forward in a plane parallel with the advance of the machine and a reel arranged to sink as to its beaters between the vertical walls of said dividers and sweep alongside and close to them.

24. The combination, in a harvester, of dividers extending forward in a plane parallel with the advance of the machine, and provided along their feet with inwardly-extending wings or flanges, and a reel arranged to sink as to the ends of its beaters between the inner faces of said dividers and sweep along them and above the flanges.

25. In combination with the horizontal driv-

ing-belt running behind the rear sill of the harvester, a shield or guard above it at the junction of the platform and elevator.

26. In combination with the horizontal driving-belt running behind the rear sill of the harvester, the keeper c^4, forming also a brace for the rearwardly-extending beam, upon which the seat is supported.

27. The casting r^3, formed with bearings for the inner sprocket-wheel and idle-roller, and with a flange to cover the belt at the junction of the platform and elevator.

28. The casting r^3, arranged to bind the timbers at the junction of the platform and elevator, and formed with a flange to overlie and protect the gearing at said point.

29. The rotary feeder or sweep above the junction between the platform and elevator, supported or overhung from the front of the machine, to allow the heads of long grain to pass at the rear.

30. The combination of the overhung float and the overhung rotary feeder or sweep at its foot, whereby long grain may pass from the platform to the elevator and up the latter without interference.

SYLVANUS D. LOCKE.

Witnesses:
JOSEPH G. PARKINSON,
JOHN W. CORSON.