

(No Model.)

2 Sheets—Sheet 1.

L. MILLER.
GRAIN BINDING HARVESTER.

No. 371,698.

Patented Oct. 18, 1887.

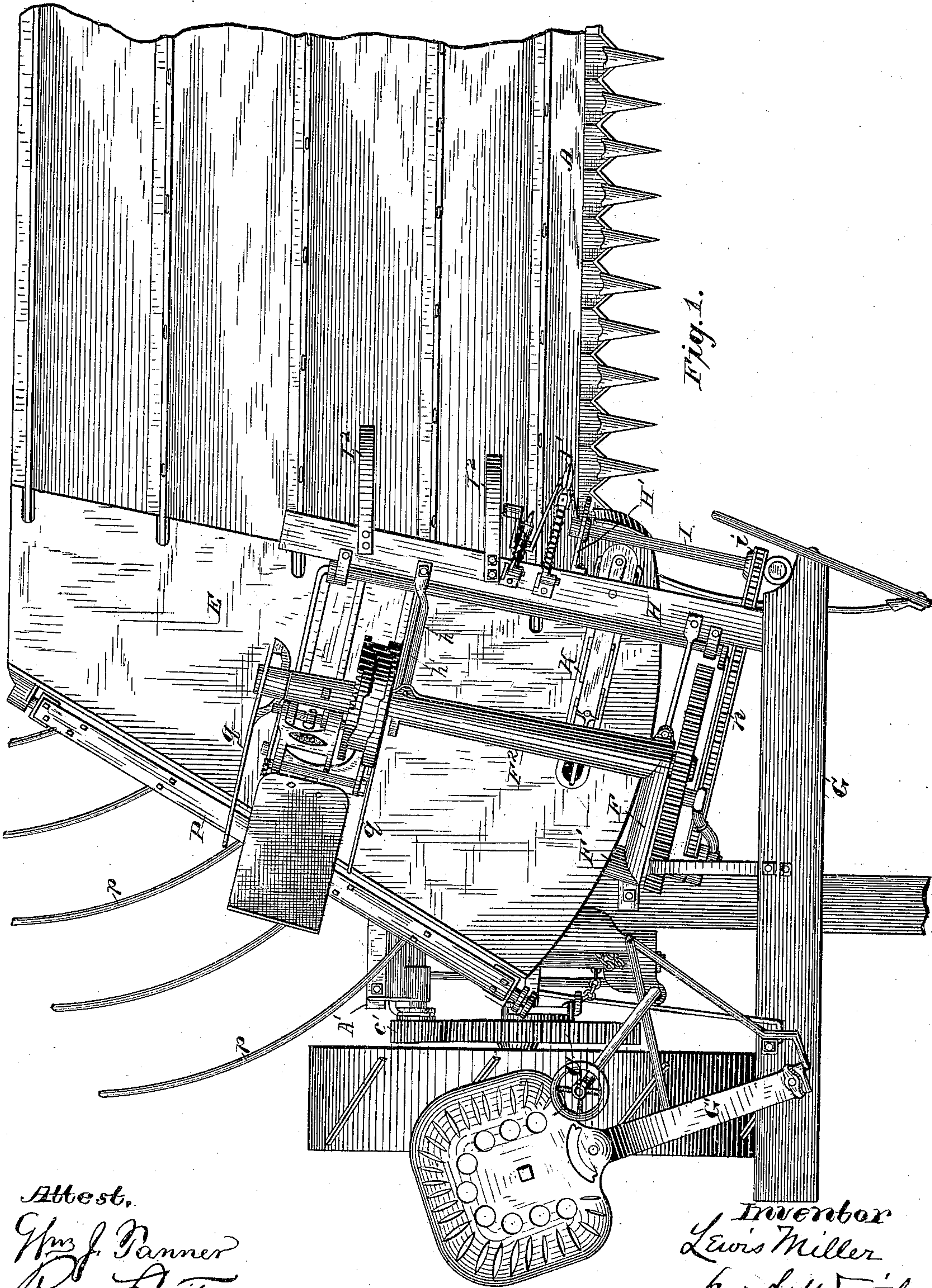


Fig. 1.

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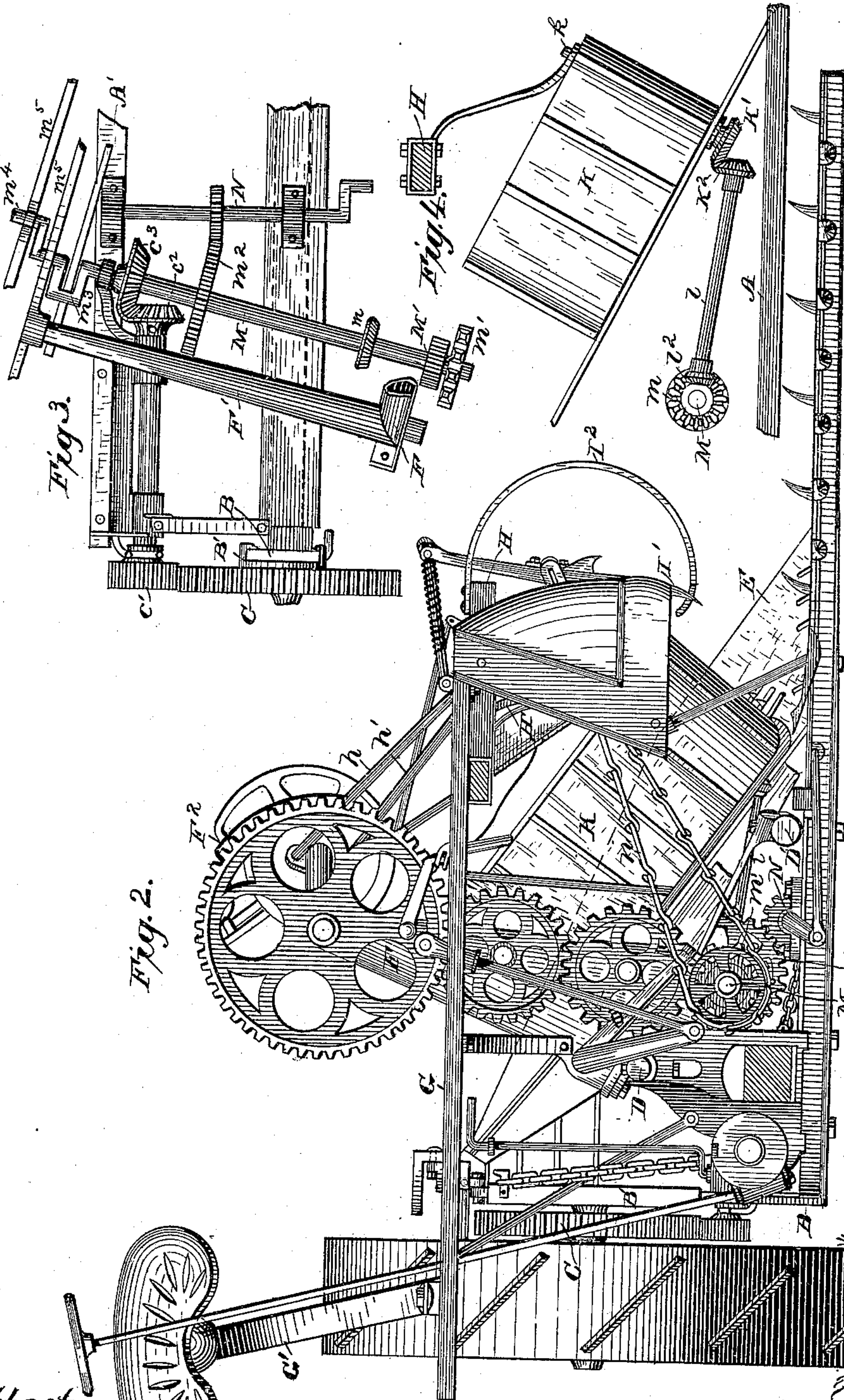
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UNITED STATES PATENT OFFICE.

LEWIS MILLER, OF AKRON, OHIO.

GRAIN-BINDING HARVESTER.

SPECIFICATION forming part of Letters Patent No. 371,698, dated October 18, 1887.

Application filed July 10, 1883. Serial No. 100,447. (No model.)

To all whom it may concern:

Be it known that I, LEWIS MILLER, of Akron, county of Summit, and State of Ohio, have invented a new and useful Improvement
5 in Grain-Binding Harvesters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to the arrangement of
10 the binder-table and of the gathering, packing, binding, and discharging mechanisms relative to the grain-platform or platform-carrier and driving-wheel of the machine, whereby the grain in the process of being re-
15 moved from the platform or carrier, compacted into a gavel, bound and discharged, is turned from the position in which it is received upon said platform or carrier to one at an oblique angle thereto, deflected toward the
20 rear of the machine, bound on the grain side of the line of travel of the drive-wheel in the process of being moved or turned, as described, and then discharged into a suitable dumping bundle-carrier or upon the ground behind the
25 driving-wheel, in the manner and by means substantially as hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a plan or top view of a machine
30 embracing my improvements. Fig. 2 is a front elevation of the same. Fig. 3 is a plan view with the binder-frame removed, showing the inner ends of the platform-sills and the arrangement of gearing for actuating the several operative parts of the machine; and Fig.
35 4 is a front elevation of a portion of the forward sill of the machine, binder-table, picker-supporting bar, butting device and its actuating mechanism.

40 A represents the forward transverse frame-bar of the machine, which may also form the forward platform-sill and the finger-bar, or the latter may be attached to said bar in any usual manner, and A' the rear platform-sill,
45 said parts being connected by longitudinal bars and braces in any suitable or preferred manner.

To the inner end of the bar or sill A is secured the upright standard B, which is curved
50 in the arc of a circle of which the secondary or pinion shaft is the center, and forms the

support for the grooved block or sleeve B', adjustable thereon, and to which is secured the axle upon which the main drive-wheel is mounted.

To the driving-wheel is secured a spur-gear, C, from which motion is imparted to a pinion, c', on the secondary shaft referred to, thence, through bevel-gears c² and c³, to the main binder-gear shaft, and from the latter to the
60 various operative parts of the machine, in a manner hereinafter explained; or, if preferred, sprocket-wheels and a driving-chain may be substituted for the spur-gear C and pinion c'. For the construction hereinafter
65 described I prefer the spur-gear and pinion, as by their use I am enabled to contract the space between the front and rear sills referred to and to locate the rear sill at or near the center of the width from front to rear of
70 the binder-table and grain platform or carrier, and thus, in connection with the rearwardly and inwardly inclined discharging edge or side of the binder-table overhanging or projecting in rear of the rear frame-sill, to
75 provide room at the side of said projecting portion of the table and in rear of the driving-wheel for the discharge of the bundle.

Upon the sills, near their inner ends, are secured suitable chairs or bracket-standards, in
80 which the inclined binder-frame is supported, said chairs and frame being similar in construction and arrangement to the corresponding parts described in Letters Patent granted to me February 12, 1884, No. 293,345, with
85 such modification as is necessary to adapt them to the oblique arrangement of the longitudinal binder-frame bars D and D', and the bearing for the binder-gear shaft referred to. The bars D and D' are by preference made to con-
90 verge toward their rear ends, and the latter, D', by preference, also, is set inclined inward toward the platform in such manner as to cross the inner end of the grain-platform obliquely, thereby giving to the inclined binder-table E,
95 secured to transverse timbers on said bars D and D', an oblique position relative to the path of the platform-carrier, the rearwardly and inwardly extending direction of the outer side of the binder-table, giving to the latter
100 not only a greater divergence from the line of draft, as shown, but in consequence of the ver-

tical inclination of the table and the shortening in width of the rear end thereof, due to the convergence of its sides, a rearwardly downward inclination is also given to the outer edge of said table and to the pivot or inner edge of the dumping-tray connected therewith, as hereinafter described, which greatly facilitates the labor of discharging the bundles.

The grain-platform is provided with a carrier for moving the grain inward to the foot of the binder-table, said carrier being by preference composed of endless toothed chains, or it may be of a series of parallel toothed bars, the teeth of which may be adapted to yield or fold in any usual or preferred manner for releasing themselves from the grain as they deliver it to and pass through slots in the obliquely-arranged inner edge of the binder-table.

In consequence of the oblique arrangement of the lower side of the vertically-inclined binder-table relatively to the horizontal carrier, the grain will be received and caught and held by the rear end thereof, and the carrier-teeth at the rear passing through the slots in the edge of the binder-table and escaping from the grain will pass under said table in advance of those at the forward end, and the latter, continuing to act on the grain, will move the butts of the grain farther inward until they in their turn pass under the table, leaving the straw lying parallel, or nearly so, with the oblique lower side of said table.

The platform-carrier may be driven from the cutter crank-shaft, hereinafter referred to, or in any other suitable manner.

Represents the binder-gear standard, which is secured to the binder-frame in advance of the line of cut of the cutting apparatus or exterior to the curved or angular line of movement of the butts of the grain, so as not to interfere with the movement of the butts of the grain over the binder-table, and it is set obliquely to said line of cut in such manner that its tubular arms F' and F'' , projecting inwardly, one under and the other over said table, and forming bearings for the knotter-actuating and needle shafts, shall stand obliquely to the line of travel of the platform-carrier, and shall bring the plane in which the gathering, packing, and binding mechanisms operate into an oblique relationship to the line of cut, and to the line of movement of the grain while on the horizontal carrier.

The mechanism for binding the grain, aside from its oblique arrangement, is similar to the well-known Appleby mechanism, and is shown in patents granted to me April 24, 1883, No. 276,448, and December 18, 1883, No. 290,459, and it is unnecessary, therefore, to describe the same herein in detail.

G is the driver's foot-board, arranged in advance of the gear-standard F and connected with and supported from said standard by suitable angular struts and ties or braces in a manner similar to that described in Letters Patent No. 276,448, granted to me April 24,

1883. To the outer or stubble end of this bar is secured the driver's seat support G' , and to its inner end is secured the forward end of a bar, H, which projects rearwardly over the inner lower edge of the inclined binder-table or delivery end of the platform-carrier in a line oblique to the path of the machine and parallel, or nearly so, with the obliquely-arranged inner edge of the binder-table, as shown. The bar H, in addition to being connected with the bar G, is connected in rear of the latter with the tubular arm F'' by suitable diverging or V-shaped braces, h h' , which serve to properly uphold said bar above the path of the grain on the binder.

The bar H serves as a support for pendent brackets H' , in which the shaft I, actuating the pickers or gatherers I' , is mounted, the oblique arrangement of said bar, conforming to that of the binder mechanism, serving to give a corresponding arrangement to the shaft I and to the pickers or gatherers actuated therefrom, thereby adapting the pickers or gatherers to move the forward ends or butts of the grain farther inward on the grain platform or carrier to conform to the oblique arrangement of the binder-table. This arrangement of the shaft and fingers of the gathering device or mechanism adapts the fingers to move in vertical planes oblique to the path of the platform-carrier and the line of cut, and the fingers, as they move outward to take the grain from the carrier, move also obliquely forward in such manner that the forward finger takes hold upon the butts of grain near the line of cut at a point beyond the heel end of the cutting mechanism, and serves to pull said butts inward and backward in a manner that will be readily understood. Instead of pickers or gatherers, a yielding float or curved springs, I'' , may be employed under the oblique arrangement shown to hold the grain down upon the delivery end of the platform-carrier and lower edge of the inclined table E, and to assist the carrier in swinging the butts of the grain around, as described.

K is the butting device, consisting, by preference, of an endless slatted apron moving around suitable rollers mounted in an upright frame pivoted at its lower end at or near the foot of the inclined table E, near its forward end and at a point in advance of the line of cut, extended so as to locate said end forward of the path of the incoming butts of grain. The butter extends thence inward, rearward, and upward, crossing obliquely the vertical plane of the line of cut, this arrangement adapting it to stand clear of the grain until the latter is brought well within reach of its butting face proper by the action of the carrier, assisted by the obliquely-moving gathering finger or fingers above described, or other suitable mechanism. The upper end of the butter may be adjusted backward or forward by any usual or suitable means for that purpose.

By proper adjustment of the butting device it is made to materially assist in swinging the

butts of the grain around and well back upon the binder-table and in bringing the grain into position conforming to the oblique position of said table.

5 The shaft k of the lower roller of the butting device extends through the inclined binder table or support, and is provided with a bevel-gear, k' , acted upon by a bevel-gear, k^2 , on an inclined transverse shaft, l , having on its inner end a bevel-pinion, l^2 , which engages with and is actuated by a bevel-gear, m , on the first or main binder-gear shaft M , near the forward end of the latter.

15 The shaft M is mounted in suitable bearings on the binder-frame and platform-sills, and is arranged in parallel relation to the tubular bearings F' and F^2 of the needle and knotter actuating shafts and obliquely to the path of the machine, and is driven from the secondary or pinion shaft through the bevel-pinions c^2 and c^3 , above referred to. The shaft M is provided with suitable cranks for actuating the packers, with a sprocket-wheel, m' , on its forward end, from which motion is imparted, 25 through a driving-chain, n , and a sprocket-wheel, i , on the forward end of the picker-shaft I , to the latter. In rear of said sprocket-wheel is a spur-gear, M' , from which motion is imparted to the train of gears actuating the binding mechanism, with the bevel-gear m actuating the shaft k of the butting device, as above described.

30 In rear of the bevel-gear m the shaft M is provided with a slightly-tapering spur-gear, m^2 , engaging and driving, through a pinion of corresponding shape, the crank-shaft N , from a crank on the forward end of which motion is imparted through a suitable connecting-rod to the knife or sickle bar, and the latter shaft, 40 N , mounted in suitable bearings in the platform-sills and arranged at right angles thereto, may serve, also, for actuating the platform-carrier, or inner roller-shaft of the latter, as hereinbefore stated. The shaft M is further provided with 45 suitable cranks, m^3 m^4 , for actuating oscillating packers m^5 , similar to those of Appleby, referred to, and which, under the arrangement of the shaft described, will operate in vertical planes at right angles thereto and to the inclined plane of the obliquely-arranged binder-table in a manner that will be readily understood. The first or main binder-gear shaft is thus, though occupying the oblique position shown, made to actuate all the operative parts 55 of the machine.

60 To the inwardly and downwardly inclining rear or outer edge of the binder-table E , in suitable arms or brackets, is pivoted the inner end of a dumping-tray or bundle-receptacle, consisting of the pivotal bar P and the curved fingers p , projecting outwardly and rearwardly therefrom, as shown. The forward fingers of this receptacle are, by preference, made longer than the others, gradually shortening to the rear to conform to the difference in degree of elevation of the discharging edge of the table E and the consequent greater dis-

tance the butts of the grain have to travel as compared with the heads to reach the ground.

70 In consequence of the oblique position of the pivotal bar P relative to the path of the machine, and the swinging of the butts of the grain in the arc of a circle, as described, in getting the same to and over the vertically-inclined binder-table, in which movement said 75 butts will be carried considerably back of the line in which they were deposited on the platform-carrier, the forward end of the receptacle will be carried sufficiently far back to permit its forward fingers, when the receptacle 80 is dumped, to drop down behind the driving-wheel, thus causing the bundles to be discharged upon the ground behind said wheel. The necessity for raising the bundles sufficiently high to carry or eject them over the 85 wheel is obviated by the described oblique arrangement of the parts, thereby greatly reducing the amount of power required as compared with machines in which the bundles are ejected over the driving-wheel. The verti- 90 cally-inclined binder-table, with its converging sides, and the receptacle, with its shortening-fingers, together approximate in form a quadrant platform, over which the grain is moved or swung in an arc of a circle from the position in which it falls upon the platform-carrier to one at or nearly at right angles thereto, in which it is deposited on the ground. 95

The driver's seat is supported above the driving-wheel on a suitable standard attached 100 to the outer end of the foot-board G , and is outside of or in advance of the path in which the butts of the grain are moved, and in convenient position for enabling the driver to adjust the frame, reel, or dumping-receptacle. 105

The knotter-actuating shaft is provided with an arm or arms, q , which serve to eject the bundles from the binder-table to and upon the bundle-carrier, or, where the latter is not used, upon the ground behind the driving-wheel 110 and at the side of the rearwardly-projecting edge of the binder-table, as described. Other suitable ejecting-arms may be employed, arranged to conform to the oblique position of the binder-table. 115

From the above description it will be seen that the platform-carrier, the pickers or gatherers interposed between the carrier and the binding mechanism, the "butt-board," the binder-table, binding mechanism, and ejecting devices, in their oblique relation to the path of the platform-carrier, and the dumping-tray, when used, under the construction and arrangement described are all made to assist in swinging the grain around in the process 125 of gaveling, binding, and discharging the same behind the machine or rearwardly thereof, instead of carrying it over the driving-wheel, as is ordinarily done in this class of grain-binding harvesters. 130

In the references made herein to planes of motion or movement the terms indicating the same are used in a relative rather than in an absolute sense, and as including planes ap-

proximately vertical or otherwise, as the case may be—as, for example, when the needle is described as moving in a vertical plane, the grain-platform is assumed to be horizontal, so that its carrying mechanism may be said to move in a plane at right angles to a vertical plane. Of course it will be understood that as any of these assumed vertical planes are deflected forward or backward by the adjustments of different parts of the machine, or by the tilting thereof on its pivotal points, the others may be correspondingly deflected without any substantial departure from the scope of the present invention; and the terms designating planes of movement, as employed in the claims hereunto annexed, are used in the sense thus indicated.

Parts of the machine not particularly described may be similar to the corresponding parts described in other patents referred to, or they may be constructed and arranged in any usual or preferred manner.

Having now described my invention, what I claim as new is—

1. The combination of the side-delivery platform-carrier of a grain-harvester, adapted to move and deliver the grain in a direction parallel with the line of cut, a binder-table located at the inner end thereof, the needle of a self-binding apparatus arranged to operate in a vertical plane oblique to the vertical plane of the grain-carrier movement, and mechanism operating between said platform-carrier and needle for turning the grain into proper position to be acted upon by said needle, substantially as set forth.

2. In a low-down self-binding harvester, the combination of a system of packers with mechanism for delivering the grain thereto, the path of motion of the packers being oblique to the path of the grain-delivering mechanism, substantially as described.

3. In combination with the side-delivery platform-carrier of a grain-harvester, adapted to move and deliver the grain in a direction parallel with the line of cut, a binder-table located at the inner side thereof, and a packing and binding mechanism located and adapted to operate in a vertical plane oblique to the vertical plane of the grain-carrier movement, substantially as set forth.

4. In a self-binding harvester, a side-delivery platform-carrier, in combination with a system of obliquely-arranged packers, and a mechanism, also obliquely arranged, operating between the carrier and packers to turn the grain and deliver it to said packers, substantially as described.

5. In a self-binding harvester, a side-delivery platform carrier, in combination with the obliquely-arranged packers, intermediate mechanism operating independently of the carrier to deliver the grain to the packers, and an, obliquely-arranged binder mechanism, substantially as described.

6. In combination with the side-delivery platform-carrier of a grain-harvester, adapted

to move and deliver the grain in a direction parallel with the line of cut, a binder-table located at the delivery side thereof, and a binder-gear standard arranged in a plane oblique to the vertical plane of the grain-carrier movement, and provided with rigid tubular arms extending rearwardly in a direction oblique to the line of travel of the machine, substantially as set forth.

7. In combination with the side-delivery platform-carrier of a grain-harvester, adapted to move and deliver the grain in a direction parallel with the line of cut, a binder-table located at the delivery side thereof, the needle of a self-binding apparatus arranged to operate in a vertical plane oblique to the vertical plane of the grain-carrier movement, and grain moving and packing mechanisms for advancing the grain in an oblique angular or curved direction from the delivery end of the platform-carrier to the place of binding, substantially as set forth.

8. In combination with the side-delivery platform carrier of a grain-harvester, adapted to move and deliver the grain in a direction parallel with the line of cut, a binder-table located at the delivery side thereof, a binding mechanism located at an oblique angle to the line of movement of the grain-carrier, and a mechanism adapted to advance the butts of grain in an oblique angular direction from the carrier to the binding mechanism.

9. In combination with the side-delivery platform-carrier of a grain-harvester, adapted to move and deliver the grain in a direction parallel with the line of cut, an inclined elevating binder-table located at the delivery end thereof, with its receiving end oblique to the line of movement of the machine, substantially as set forth.

10. In combination with the side-delivery platform-carrier of a grain-harvester, adapted to move and deliver the grain in a direction parallel with the line of cut, an inclined elevating binder-table located at the delivery side thereof, with its receiving end oblique to the line of the movement of the machine, and the needle of a self-binding apparatus arranged to operate in a vertical plane oblique to the vertical plane of the grain-carrier movement, substantially as set forth.

11. In combination with the side-delivery platform-carrier of a grain-harvester, adapted to move and deliver the grain in a direction parallel with the line of cut, an inclined elevating binder-table located at the delivery side thereof, with its receiving end oblique to the direction of the grain-carrier movement, the needle of a self-binding apparatus arranged to operate in a vertical plane oblique to the vertical plane of the grain-carrier movement, and suitable interposed mechanism independent of the grain-carrier for moving the grain in a curved or angular path from the delivery end of the horizontal carrier to the said needle, substantially as set forth.

12. In combination with the side-delivery

platform-carrier of a grain-harvester, adapted to move and deliver the grain in a direction parallel with the line of cut, a binder-table arranged at the delivery side thereof, with its receiving end oblique to the direction of the grain-carrier movement, and the needle and packers arranged to move in vertical planes oblique to the vertical plane of the grain-carrier movement, substantially as set forth.

13. In combination with the side-delivery platform-carrier of a grain-harvester, adapted to move and deliver the grain in a direction parallel with the line of cut, an inclined elevating binder-table arranged at the delivery side thereof, and with both its receiving and delivery edges oblique to the line of movement of the platform-carrier, substantially as set forth.

14. The combination of the side-delivery platform-carrier of a grain-harvester, an inclined elevating binder-table receiving the grain from said carrier, a grain-moving mechanism adapted to engage and move said grain from such point of delivery and in an oblique angular direction as regards its previous movement, a binding mechanism for binding the same, and a discharging mechanism operating in a direction oblique to the direction of the grain-carrier movement, substantially as set forth.

15. In combination with the side delivery platform-carrier of a grain-harvester, adapted to move and deliver the grain in a direction parallel with the line of cut, the grain elevating and binding table, a grain-moving mechanism adapted to engage and move the grain from such point of delivery in an oblique angular direction as regards its previous movement, and a binding mechanism for binding the same, substantially as set forth.

16. A side-delivery platform-carrier adapted to move and deliver the grain in a line parallel with the line of cut, in combination with an inclined elevating binder-table located at the delivery side of and receiving the grain from said carrier, and a gathering-finger adapted to move in a plane oblique thereto to reach back of the delivery end of the carrier and to enter the grain near the line of cut and beyond the heel end of the cutter-bar, substantially as described.

17. A side-delivery platform-carrier adapted to move and deliver the grain in a path parallel with the line of cut, in combination with a butter crossing the vertical plane of the said

line of cut, and a gathering-finger operating upon the butts of grain, substantially as described.

18. The combination of a side-delivery platform-carrier adapted to move and deliver the grain in a direction parallel with the line of cut, a binder-table at the delivery side thereof, mechanism for gathering, packing, and binding the grain on said table, arranged obliquely to the direction of the carrier movement, and mechanism for discharging the bound bundles rearwardly of the driving-wheel and with the straw at an angle to the position in which it was received upon the carrier.

19. In combination with the side delivery platform-carrier of a grain-harvester, an inclined elevating binder-table located at the inner side thereof, a self-binding mechanism and a bundle-discharging mechanism, both obliquely arranged relatively to the direction of movement of the platform-carrier, substantially as described.

20. The binder-table located between the side-delivery platform-carrier and the path of the driving-wheel, with its outer edge arranged obliquely to the direction of movement of the platform-carrier, in combination with a dumping-tray also arranged obliquely to said platform-carrier and adapted to discharge the bundles rearwardly of the drive-wheel, substantially as described.

21. The obliquely-arranged binder-table interposed between the grain-platform and the driving-wheel, in combination with the obliquely-arranged bundle-carrier connected with the discharging-side of said table and adapted to deposit the bundles upon the ground in the path of and behind the driving-wheel.

22. The binder-table interposed between the grain-platform and the path of the driving-wheel, and provided with the rearwardly and inwardly extending outer side, in combination with a dumping tray or receptacle connected with said outer side, said table and receptacle together approximating a quadrant, over which the grain is moved in an arc of a circle in the process of being bound and discharged, substantially as described.

In testimony whereof I have hereunto set my hand.

LEWIS MILLER.

Witnesses:

O. L. SADLER,
S. P. WALLACE.