(No Model.) 4 Sheets—Sheet 1.

L. MILLER.

GRAIN BINDING HARVESTER.

No. 480,115. Patented Aug. 2, 1892.

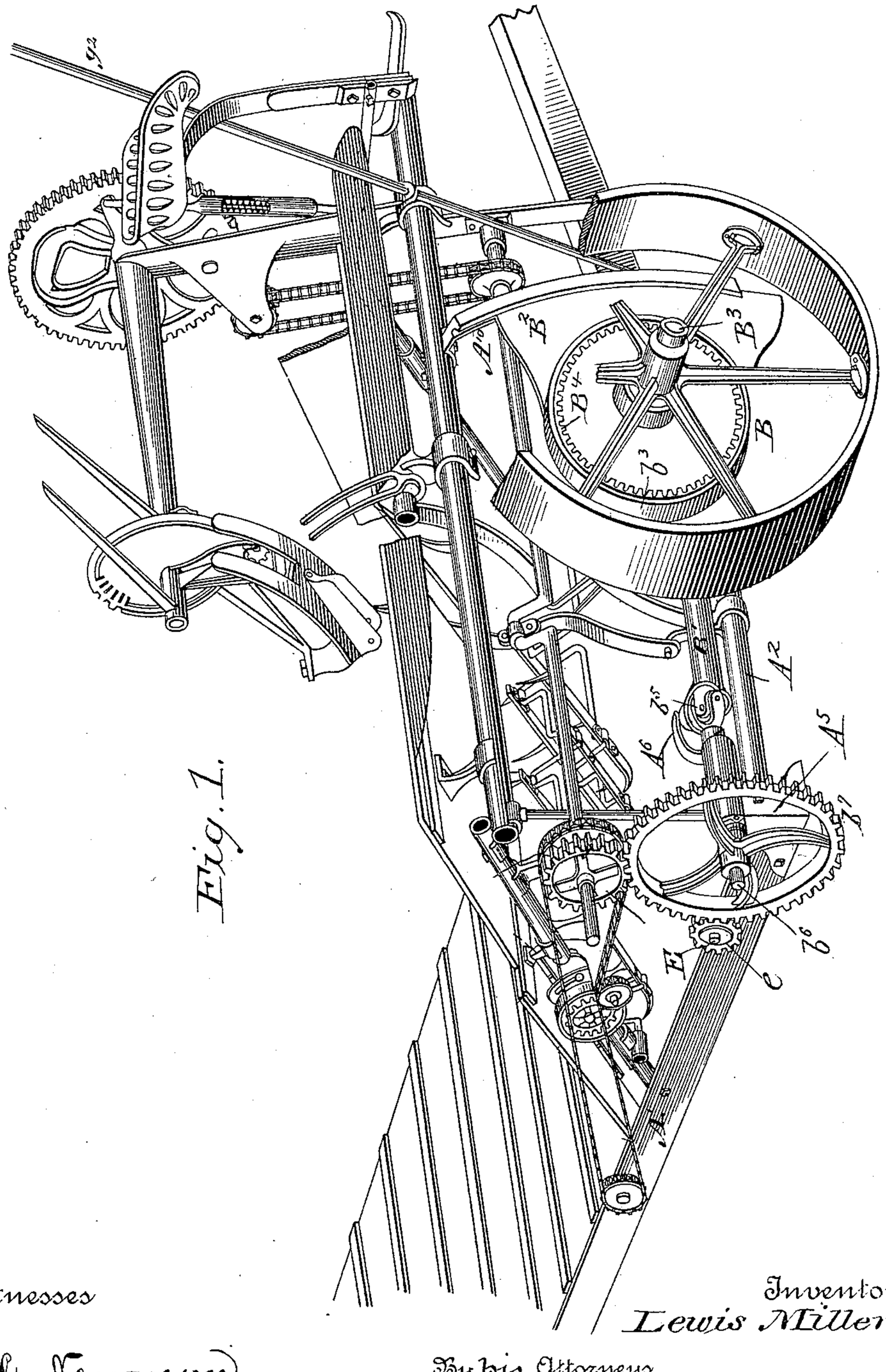

Fig. 1.

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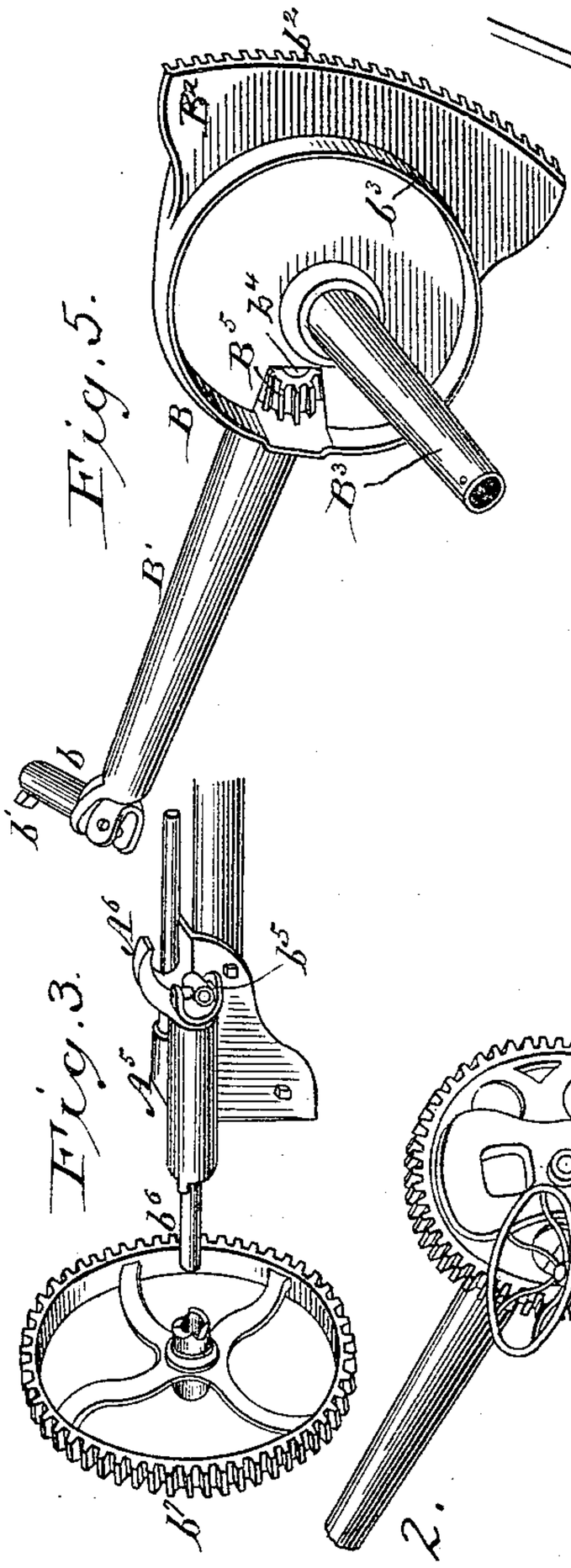

Fig. 5.

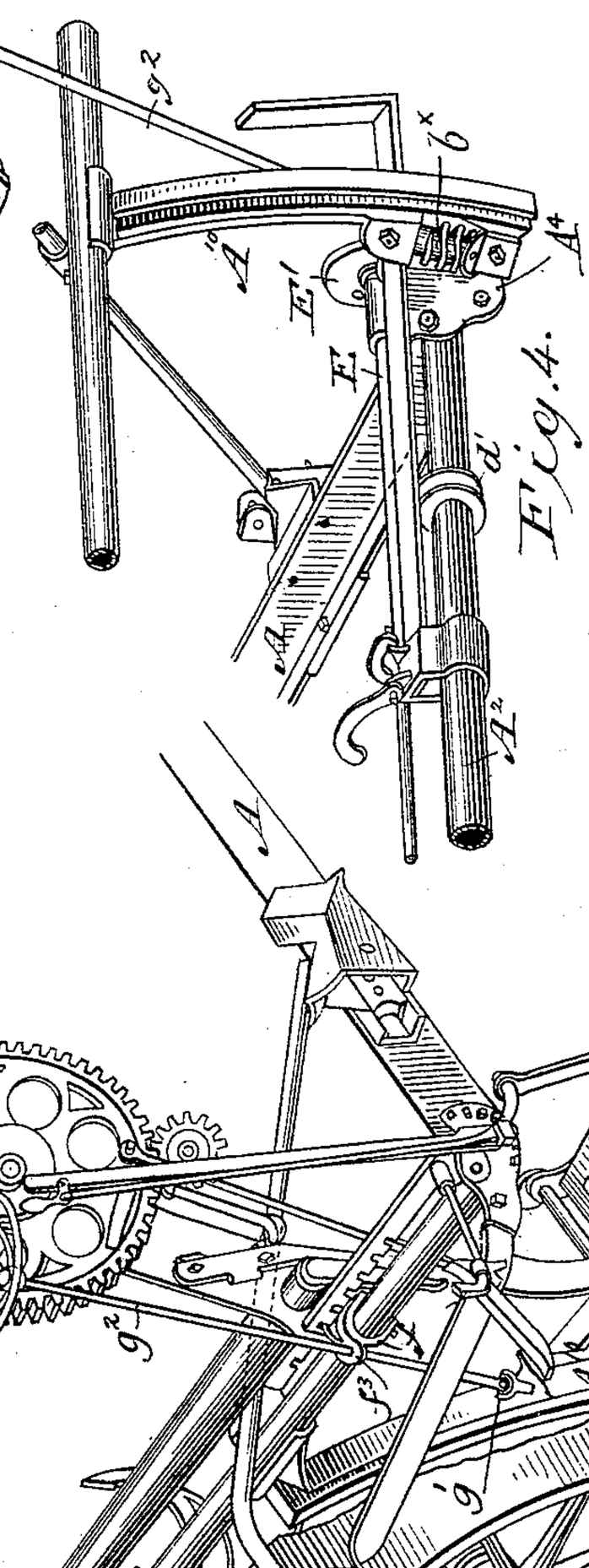

Fig. 4.

Fig. 3.

Fig. 2.

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Fig. 6ª.

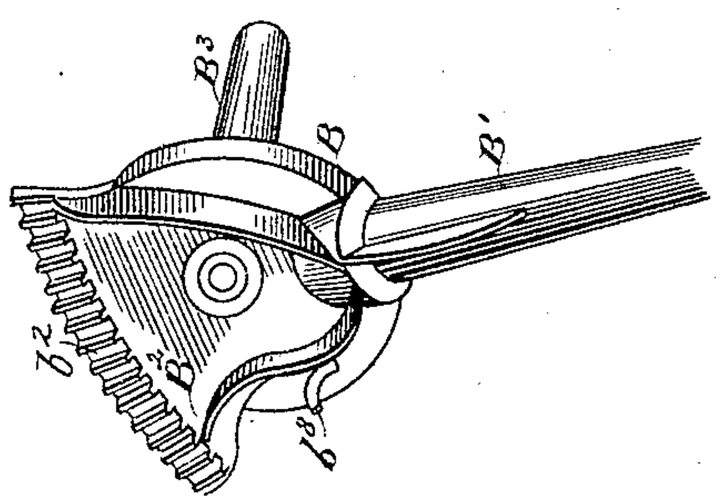

Fig. 8

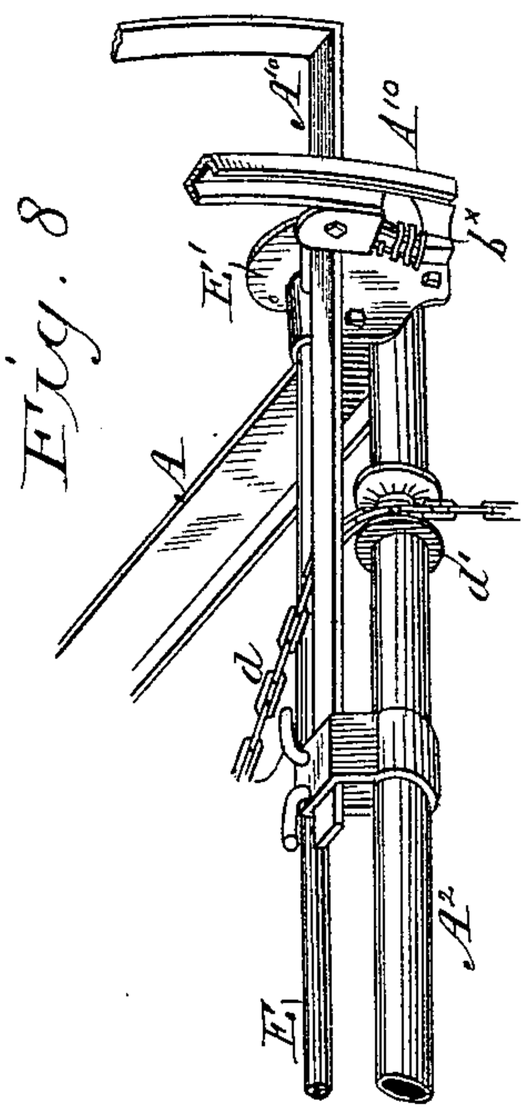

Fig. 6.

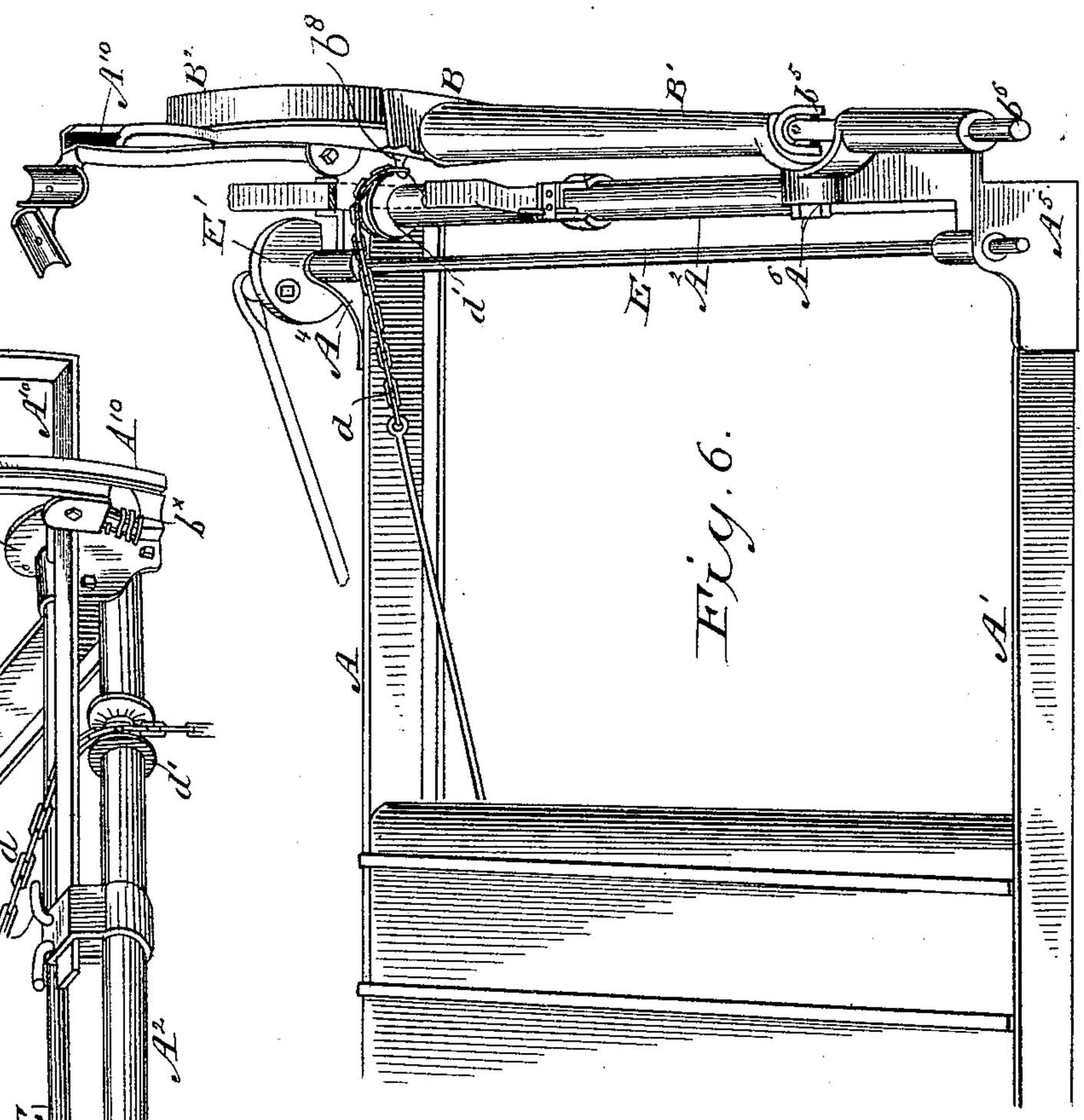

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Fig. 7.

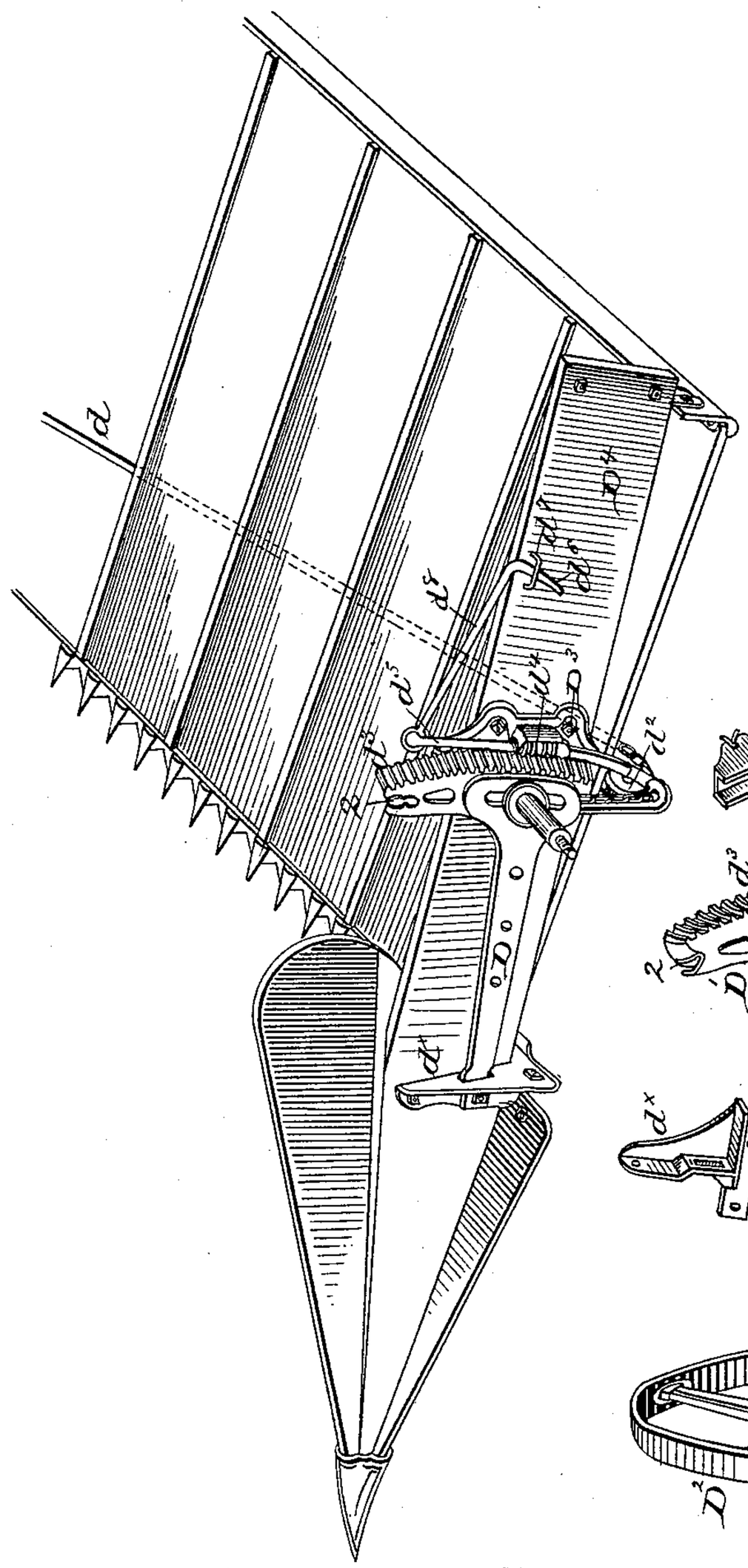
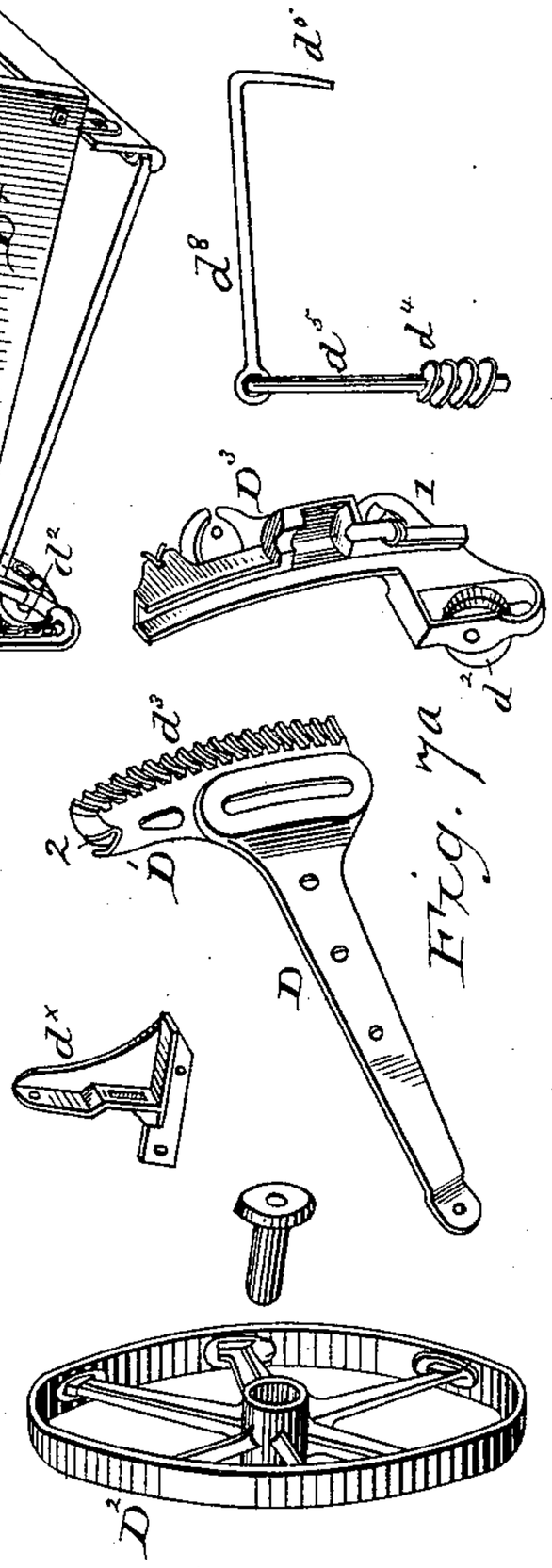


Fig. 7a.



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UNITED STATES PATENT OFFICE.

LEWIS MILLER, OF AKRON, OHIO.

GRAIN-BINDING HARVESTER.

SPECIFICATION forming part of Letters Patent No. 480,115, dated August 2, 1892.

Original application filed April 30, 1886. Serial No. 200,754. Divided and this application filed April 2, 1889. Serial No. 305,755.
(No model.) Patented in England December 22, 1888, No. 18,739.

To all whom it may concern:

Be it known that I, LEWIS MILLER, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Grain-Binding Harvesters, (for which I have received Letters Patent in Great Britain, No. 18,739, dated December 22, 1888,) of which the following is a specification.

My invention, while applicable to grain-binders generally, relates more especially to what is known as the "low-down" grain-binder. Its object is so to reorganize the present grain-binding harvester as to secure a strong, simple, compact, and effective light-weight machine, which ends I attain by the novel organization of instrumentalities hereinafter described.

The subject-matter claimed is hereinafter specifically designated in the claims at the close of this specification.

The accompanying drawings represent so much of a low-down grain-binding harvester embodying all my present improvements as is necessary to illustrate the subject-matter herein claimed.

Except as hereinafter indicated, the views are all perspectives.

Figure 1 represents the machine as seen from its rear and stubble side with a portion of the driving-wheel broken away, showing the framework, gearing, and mechanism generally; Fig. 2, a view from the front and stubble side thereof with portions of the mechanism removed, showing the framework, parts of the binder-standard, and gearing; Fig. 3, a detail view of the main driving-shaft and gear; Fig. 4, a detail view of the stubble-side front corner of the binder-frame; Fig. 5, a detail view of the driving-axle support, showing the side opposite to that represented in Fig. 6ª; Fig. 6, a view of the frame and supports for the gearing and driving-wheel; Fig. 6ª, a detail view of the driving-wheel support; Fig. 7, a view from the rear and grain side, showing the grain-wheel connections; Fig. 7ª, details thereof; Fig. 8, a detail view of the stubble end of the binder-frame and its adjusting devices.

As the subject-matter herein claimed relates, mainly, to the gearing and the mechanism for raising and lowering the main frame, it is deemed unnecessary here to describe in detail the other parts of the machine, they being, moreover, fully described and shown in other divisions of this application, respectively serially numbered and filed as follows, viz: Nos. 200,754, filed April 30, 1886; 304,945, filed March 27, 1889; and 305,753, 305,754, and 305,756, respectively filed April 2, 1889.

The front and rear transverse frame bars or sills A A′ are shown as made of angle iron or bars having horizontal flanges at their lower sides or edges turned inwardly toward each other. Longitudinal frame bars or tubes, of which the inner or gearing end one A^2 only is shown, are firmly secured to these sills at their points of intersection by means of socketed angular braces or corner-pieces A^4 A^5, bolted to the sills, in which sockets the tubes are inserted. An outward projection or over-hanging bracket on the rear corner-piece A^5 carries a sleeve or tubular bearing rigid therewith for a short secondary or counter shaft b^6, parallel with, but slightly above and outside of the longitudinal frame-tube A^2. A spur-wheel b^7 on the outer rear end of this shaft drives a corresponding spur-pinion *e* on the crank-shaft E.

The details of the axle-support B and its connections are shown in Figs. 5, 6, and 6ª. Its tubular arm or sleeve B′ is connected by a transverse pin *b* on its rear end with a transverse bearing-socket A^6 on the over-hanging bracket of the corner-piece A^5. A spur or projection *b′* at the inner end of the pivot-pin *b* prevents lateral movement of this pivot-pin in this bearing-socket while permitting it to turn freely therein.

A vertical plate B^2, constituting a forward extension or prolongation of the sleeve B′, is slightly curved on its forward edge and is movable vertically in an arc around the pivot *b* and in a vertical guideway in the standard A^{10}, erected on the outward extension or overhanging bracket of the front corner-piece A^4. The inner front edge of the plate B^2 is slightly beveled and carries segment-teeth b^2, meshing with a worm-gear $b^\times$, turning in bearings on the corner-piece A^4 inside the vertical guideway A^{10}, by which means the vertical relation of the axle-support and main frame may be varied. An axle B^3, formed upon or secured to the plate B^2,

projects outwardly therefrom concentrically with an annular flange b^3, which encircles a bevel-wheel B^4 on the driving-wheel. This bevel-wheel drives a corresponding pinion B^5 on the jointed movable portion b^4 of the bevel-wheel secondary or counter shaft, which turns in bearings in the sleeve B′. The pinion B^5 projects through or works in an opening in the plate B^2, Fig. 5. The rear end of the jointed part b^4 of the counter-shaft is coupled to the fixed part b^6 by a tumbling or universal joint b^5, coincident with the pivot b. By this means the axle-support and driving-gear mounted therein are free to move vertically relatively to the frame around the pivot b without interference with the proper working of the mechanism secured on the frame, which maintains its uniform relation thereto.

A cord or chain d, secured to the hook or eye b^8 on the axle-support, Figs. 6 and 6^a, traverses a grooved pulley d', turning loosely on the inner longitudinal frame bar or tube A^2 and extends over the crank-shaft and under the platform-carrier, and a similar pulley d^2 on the outer longitudinal frame-bar, on the divider side of the machine, or in a bracket hereinafter mentioned, Figs. 7 and 7^a, and up along the inner side of the expanded end of a plate D′ on the grain-wheel arm D, pivoted at its front end in the outer front corner-piece of the platform-frame or in a standard $d^\times$ thereon, as shown. This cord or chain is secured to the plate D′ and serves to raise and lower the divider or outer end of the platform-frame simultaneously with the corresponding movement of the drive-wheel end of the frame. The expanded end of the arm or plate D′ may be slotted to permit its adjustment on the axle of the grain-wheel D^2 and may also be provided with a toothed segment d^3 on its rear curved face, through which, by means of a worm shaft or screw d^4, the divider end of the frame may be adjusted independently of the drive-wheel, if preferred. This worm d^4 is carried by an upright shaft d^5, mounted in suitable bearings in a bracket D^3, secured to the outer grain guard or board D^4. This shaft is rotated by a crank arm or handle d^8, jointed to its upper end so as to be folded down out of the way. A hook d^6 on the handle enters an eye d^7 on the board D^4 to lock the parts in position.

In lieu of the worm or screw shaft d^5, the grain-wheel arm may be operated directly by the chain or cord d, in which case the shaft d^5 is removed out of the socket 1 in the bracket D^3 and the end of the chain d is passed through a socket 2 in the upper arm of the bracket and securely connected thereto.

The crank-shaft E, driven, as before remarked, by a spur-pinion on its rear end, extends through its bearing-sleeves on the corner pieces and carries a crank-wheel E′ on its forward end, arranged directly in front of the corner-piece A^4 and over the expanded rear part of the tongue-plate E^2, hinged to the corner-piece, thus serving to preserve the crank-wheel and its pitman connection from injury or obstruction. A vertically-perforated horizontal flange or ear f^3 on the bracket f, projecting from the binder-gear standard receives a rod or shaft g^2, connected by a universal joint g' with the adjusting-screw $b^\times$, which actuates the axle-support.

Having thus fully described the construction, organization, and operation of my improved low-down grain-binding harvester, what I claim herein as new and of my own invention is—

1. The combination, substantially as hereinbefore set forth, of the platform-frame, its inner rear corner-bracket, the sleeve-bearing thereon, the driving-wheel, its tubular arm or support interposed between the wheel and frame, the joint connecting said arm and sleeve-bearing, the two-part counter-shaft, its universal joint, the bevel-pinion B^5 on the counter-shaft, and the bevel-wheel B^4 on the driving-wheel, and the adjustable connection between the frame and the free end of the supporting-arm.

2. The combination, substantially as hereinbefore set forth, of the platform-frame, its inner corner-bracket, the sleeve-bearing thereon, the driving-wheel, the tubular arm or support on which it is mounted, interposed between the driving-wheel and the platform-frame, the joint connecting said arm and frame, the vertically-expanded plate or extension of the supporting-arm, the driving-wheel axle secured thereto, the adjustable connection between the frame and the free end of this plate, the jointed counter-shaft inclosed by the axle-support, and its driving-gears.

3. The combination, substantially as hereinbefore set forth, of the platform-frame, the fixed bearing-sleeve on the inner rear corner thereof, the axle-supporting arm jointed thereto, its vertically-expanded plate, the axle and gear-shield connected therewith, the driving-wheel or beveled gear-wheel carried thereby, and the bevel-pinion on the jointed counter-shaft, the secondary shaft driven by said bevel-wheel, and the adjustable connection uniting the free end of the axle-support with the frame.

4. The combination, substantially as hereinbefore set forth, of the platform-frame, the fixed bearing on the inner rear corner thereof, the axle-supporting arm pivoted thereto, the expanded plate forming a guide-flange as well as a support for the driving-wheel axle, a standard on the inner front corner of the platform-frame in which said guide-flange traverses, and adjusting-gear on the guide-flange, actuating corresponding mechanism on the axle-support to vary its relation to the main frame.

5. The combination, substantially as hereinbefore set forth, of the platform-frame, the fixed bearing on the inner rear corner thereof, the axle-supporting arm pivoted thereto, the driving-wheel outside both of said arm and frame, the jointed secondary or counter

shaft, the movable portion of which has bearings in the axle-supporting arm, and the gear on the driving-wheel, meshing with a pinion on said shaft.

6. The combination, substantially as hereinbefore set forth, of the platform-frame, the jointed tumbling shaft mounted on the inner rear corner thereof, the driving-wheel, its axle-supporting arm inclosing said shaft and pivoted to the frame at a point where the sections of the jointed tumbling shaft are connected, and the adjustable connection of its free end with the frame in advance of the driving-wheel.

7. The combination, substantially as hereinbefore set forth, of the transverse sills, the inner longitudinal frame bar or tube, the interposed front and rear inner or stubble side corner-pieces, the fixed bearing-sleeve for the pinion-shaft or counter-shaft, mounted on the inner rear corner-piece, the tubular arm or axle-support, the joint connecting the fixed bearing-sleeve and tubular arm, the vertically-expanded or plate-shaped extension of the jointed arm, the driving-wheel axle projecting outwardly therefrom, the standard on the inner front corner-piece, its guide-flange, the front edge of the axle-support working in the guide-flange, its rack, and the worm-gear mounted on the corner-piece and actuating the rack to adjust the axle relatively to the frame.

8. The combination, substantially as hereinbefore set forth, of the transverse sills, the inner longitudinal frame-bar, the connecting corner-pieces, the driving-wheel-axle support pivoted on the inner rear corner-piece, the guide-flange in which its free end traverses, the adjusting-gearing mounted on the inner front corner-piece, the pulley on the longitudinal frame-bar, and the lifting cord or chain passing from the axle-support over this pulley to the grain-wheel arm to adjust both ends of the frame simultaneously.

9. The combination, substantially as hereinbefore set forth, of the transverse sills, the longitudinal frame-bars, the connecting corner-pieces, the grain-wheel-supporting arm pivoted to a standard on the outer divider, a rear depending bracket on the frame, the pulley thereon, a loose pulley on the inner or stubble side supporting-bar, the driving-wheel, its axle-support hinged to a sleeve-bearing on the rear inner corner piece or bracket, the adjusting mechanism of the axle-support, and a chain or cord passing from the grain-wheel-supporting arm under its pulley, across the frame, and over the stubble-side pulley to the axle-support, so that both ends of the machine may be adjusted simultaneously.

10. The combination, substantially as hereinbefore set forth, of the platform-frame, the grain-guard board secured thereon, the grain-wheel-supporting arm pivoted to the front sill or finger beam, its expanded rear end, the sector-rack thereon, the bracket on the grain-guard, the worm carried thereby meshing with the sector-rack, and the jointed handle which actuates and locks the worm in position to adjust and hold the grain-wheel in proper relation to the frame.

In testimony whereof I have hereunto subscribed my name.

LEWIS MILLER.

Witnesses:
O. L. SADLER,
W. K. MEANS.