(No Model.) 6 Sheets—Sheet 1.

L. MILLER.

GRAIN BINDING HARVESTER.

No. 488,398. Patented Dec. 20, 1892.

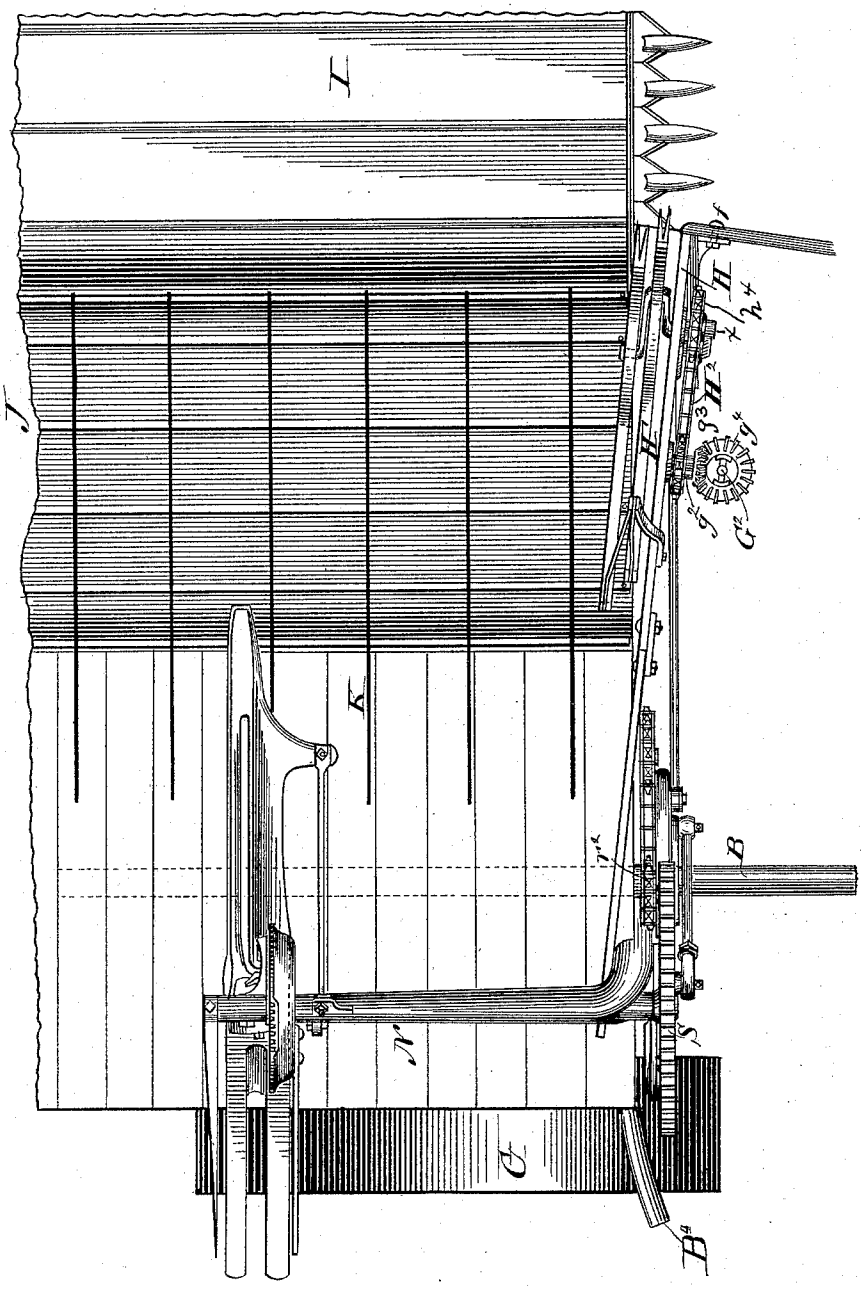

Fig. 1.

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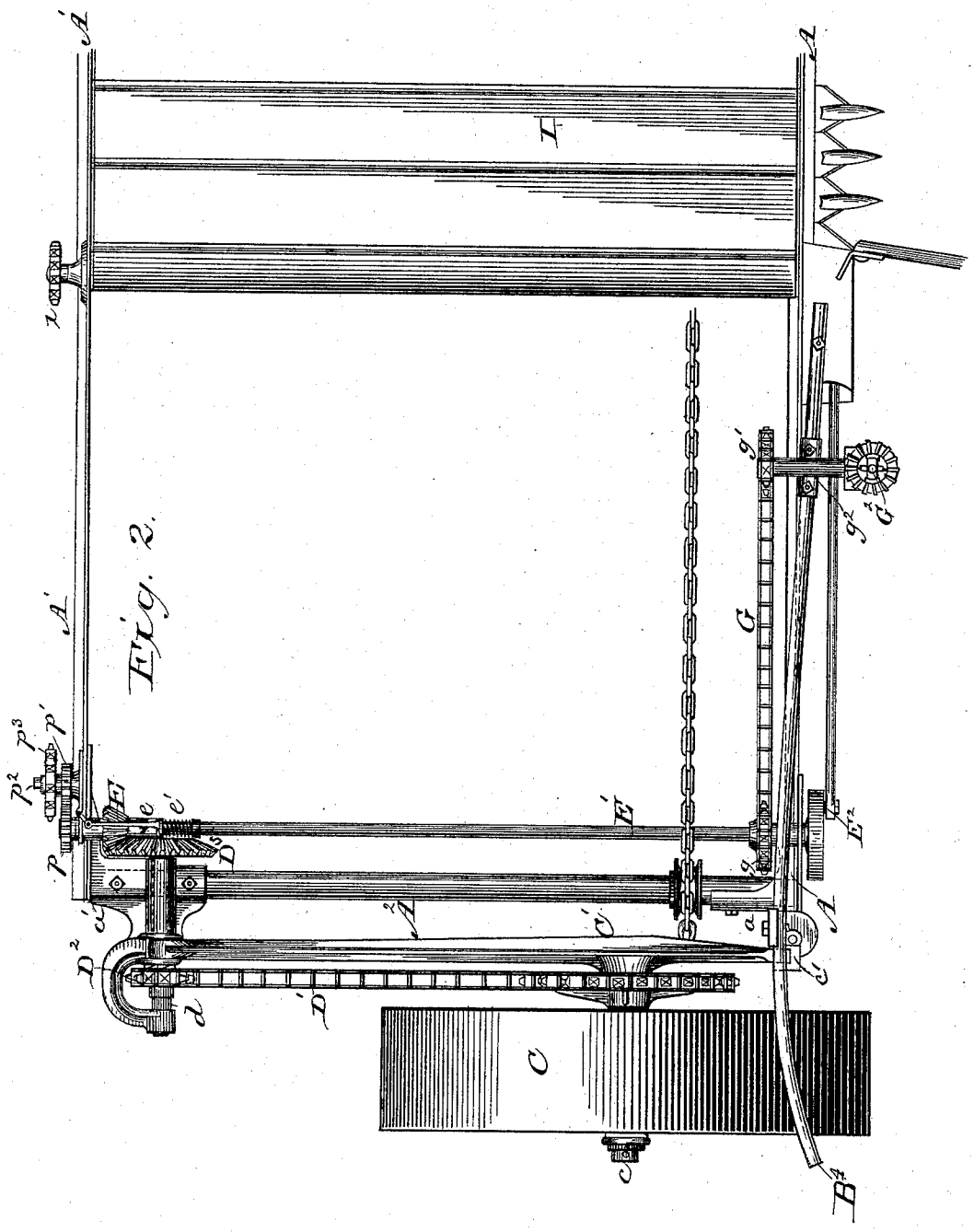

Fig. 2.

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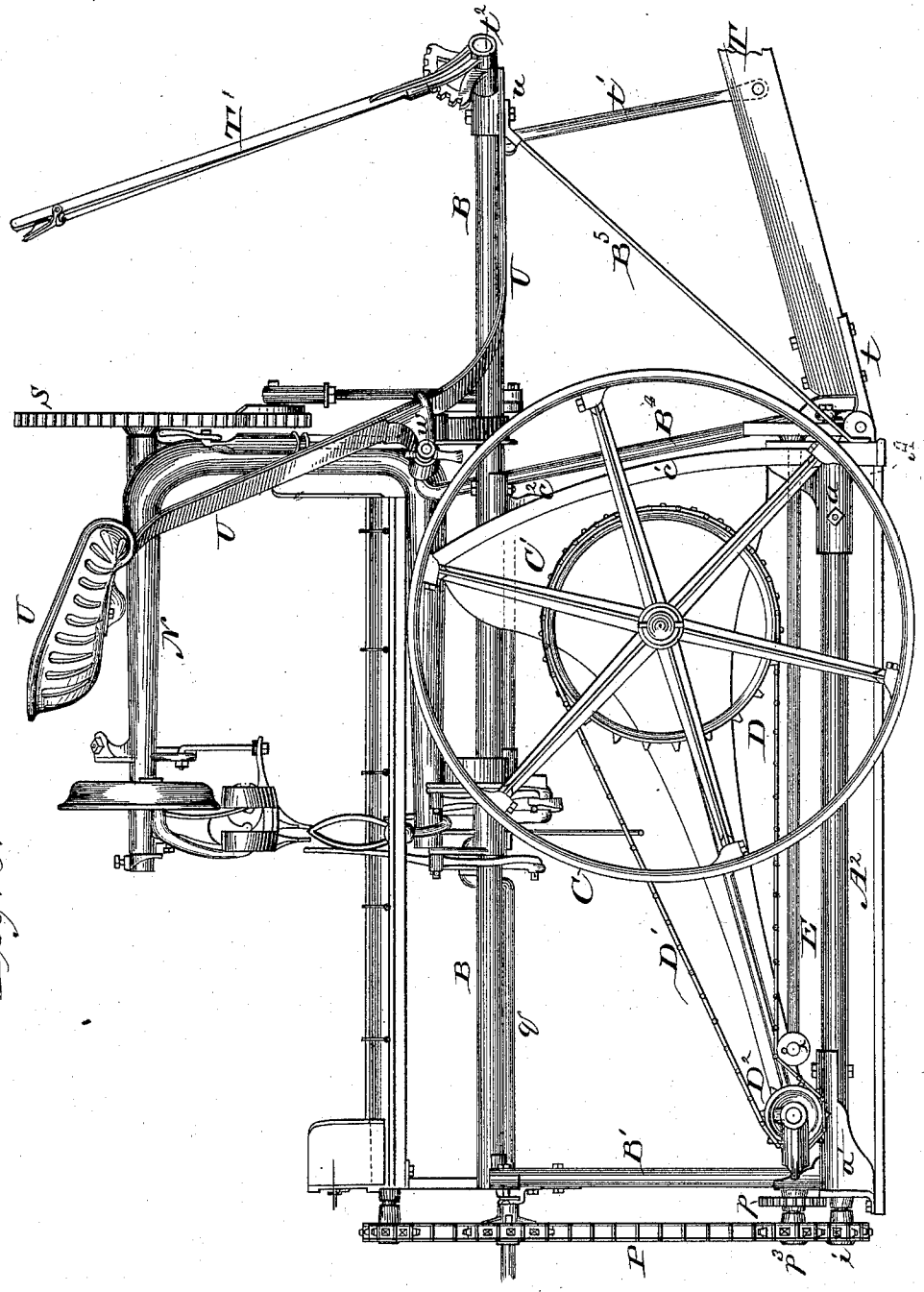

Fig. 3.

Witnesses
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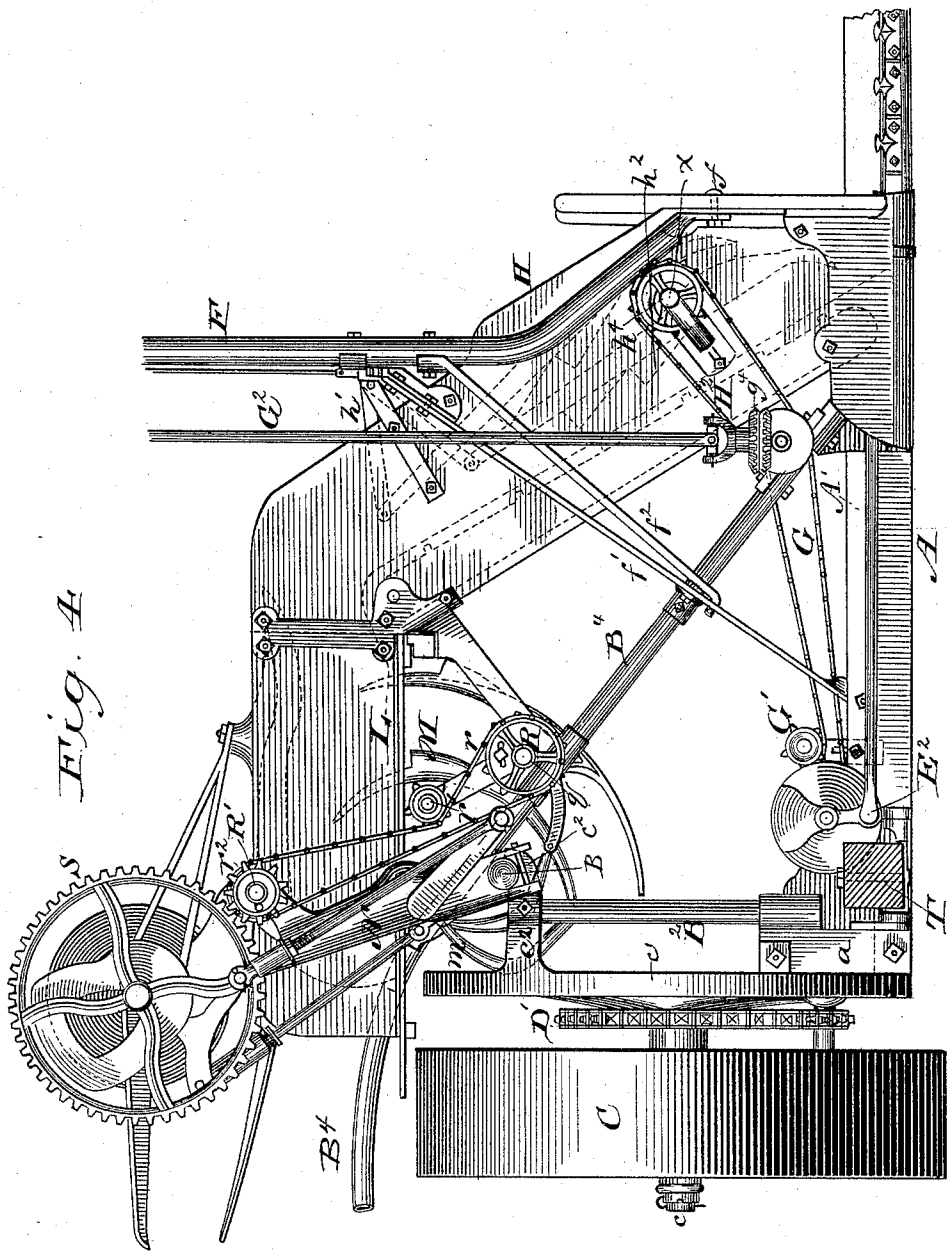

Fig. 4.

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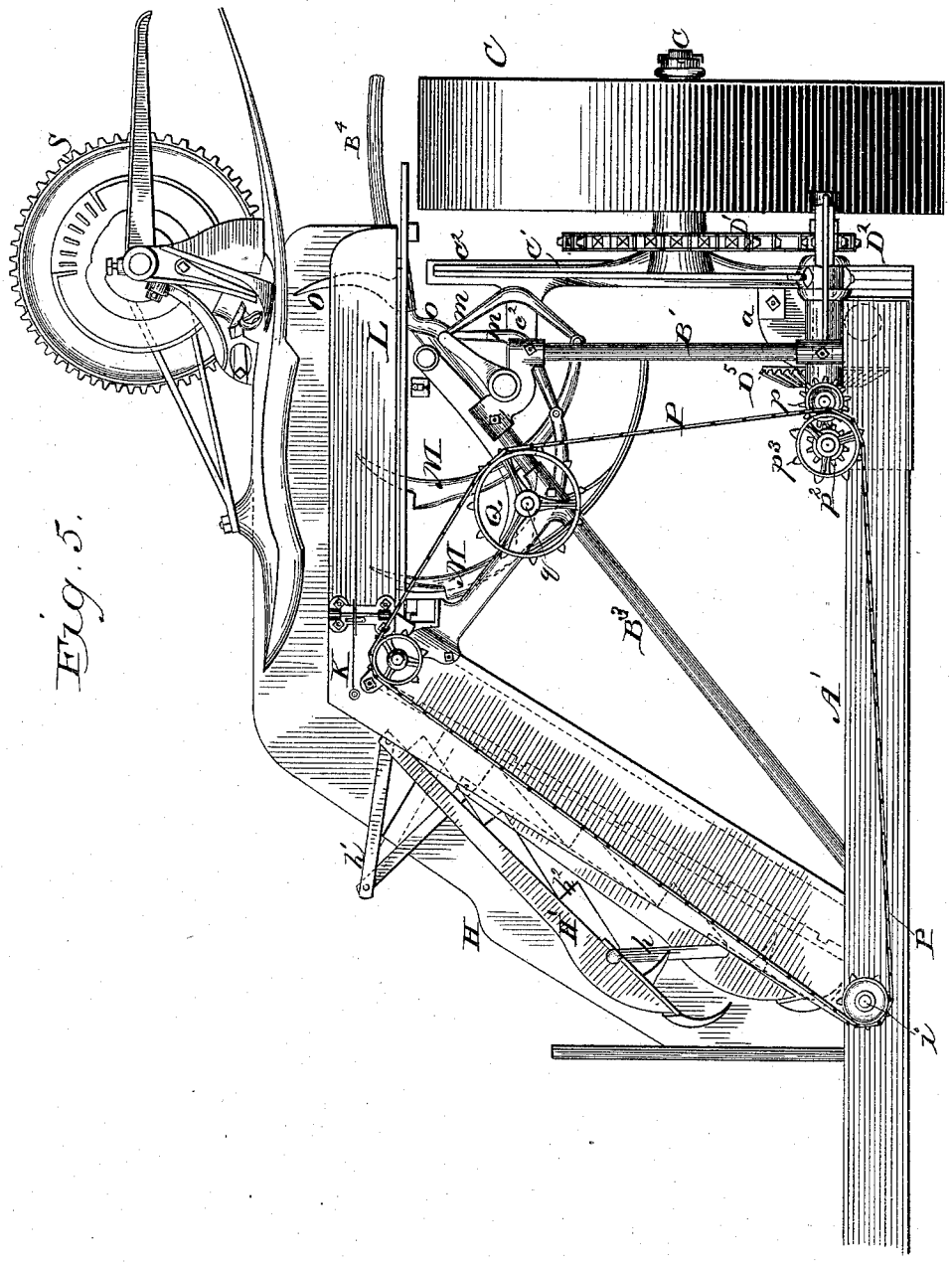

Fig. 5.

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L. MILLER.

GRAIN BINDING HARVESTER.

No. 488,398. Patented Dec. 20, 1892.

Fig. 8.

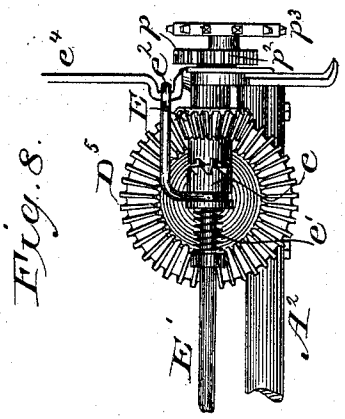


Fig. 6.

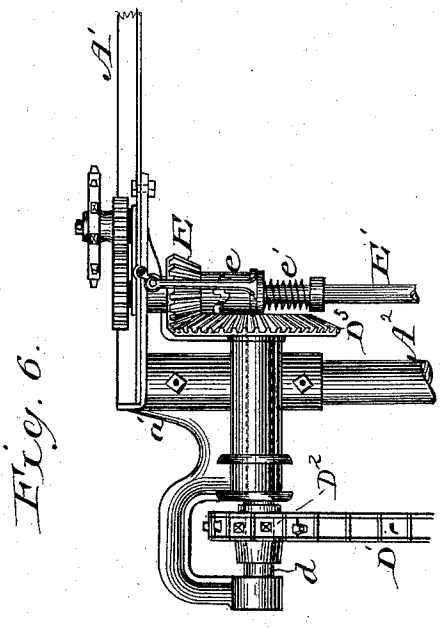
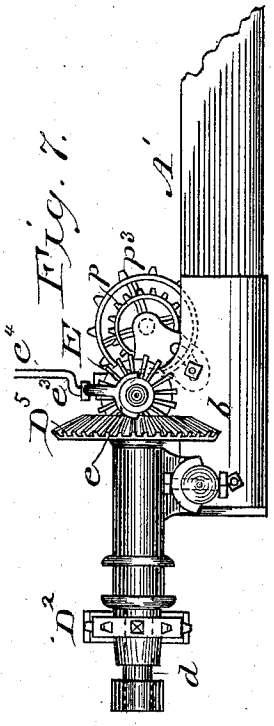


Fig. 7.



Witnesses

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Louis G. Julihn

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UNITED STATES PATENT OFFICE.

LEWIS MILLER, OF AKRON, OHIO.

GRAIN-BINDING HARVESTER.

SPECIFICATION forming part of Letters Patent No. 488,398, dated December 20, 1892.

Application filed November 16, 1889. Serial No. 330,607. (No model.)

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, of which the following is a specification.

My present invention more especially relates to that class of grain-binding harvesters in which the cut grain is elevated, bound, and discharged over the driving-wheel; its object is to secure a compact, simple, and effective organization; to which end my improvements consist in an improved organization of the frame, the elevating and binding mechanism, and their actuating gearing.

The subject-matter claimed is hereinafter specifically designated.

The accompanying drawings represent so much of a grain-binding harvester embodying all my improvements as is necessary to illustrate the subject-matter herein claimed. Some of said improvements may however be used without the others and in machines differing to some extent in their details of construction from those herein shown.

Figure 1 is a plan of a portion of the grain-binding side of the harvester with portions of the apparatus removed in order to show the other parts more clearly; Fig. 2 is a similar view with the elevating, reeling, and grain-binding mechanism removed to show the parts beneath them; Fig. 3 is a stubble-side elevation of the machine; Fig. 4 is a front elevation of the binder-end of the machine; Fig. 5 is a similar rear-elevation; Figs. 6, 7, and 8, are respectively, a plan, a front, and a side elevation on an enlarged scale of the inner rear corner of the main or platform-frame, showing more particularly the details of the gearing, and shipping-mechanism.

The main or platform-frame is shown as consisting of front and rear transverse frame-bars or sills A, A′, of angle-iron, to which angular socketed brackets or corner-pieces *a*, *a′*, are secured. Longitudinal frame-bars or tubes are inserted into and secured to these brackets. The drawings show the one A^2 on the binder, inner, or stubble-end of the frame; which will illustrate the construction. A longitudinal supporting-bar B is mounted upon upwardly extending standards B′, B^2, secured to these corner-pieces. This bar extends in front of the frame for a purpose hereinafter described. Inclined transverse bracing-bars B^3, B^4, connect the platform-frame with this supporting-bar, thus affording firm support for the binder-mechanism.

The driving-wheel C is shown as mounted on a stud-axle *c* projecting on the stubble-side of a supporting-arm or plate C′, pivoted or jointed at its rear-end to the bracket *a′*, projecting from the inner rear corner of the main-frame, while its forward end which is widened and extends in front of the axle is curved in the arc of a circle around its rear pivot and movable and supported in a correspondingly curved guide *c′*, secured upon a projection or lug on the inner front corner piece *a* of the main or platform-frame and connected by a bracket c^2 with the bar B^2—See Fig. 4. The guide is thus firmly braced, and both it and the supporting-plate C′ are thrown outside of the longitudinal bar B.

A sprocket-wheel D, between the driving wheel and its supporting-arm or plate C′ mounted on the driving-axle drives a sprocket-chain D′, encircling a sprocket-pulley D^2 on a transverse counter-shaft *d*, mounted in the bracket *a′* above-mentioned on the inner rear corner of the frame and concentric with the axis or pivot on which the supporting-arm C′ of the driving-wheel turns. This organization brings the sprocket-chain D′ between the driving-wheel and its supporting-arm, and outside of the latter, and enables both to play freely around the rear cross-shaft without deranging the gearing. The inner end of this counter-shaft or cross-shaft *d* carries a bevel-wheel D^5 driving a corresponding gear E, on a longitudinal crank-shaft E′, turning in suitable bearings in the platform-frame inside of, but slightly above and parallel with the tubular frame-bar A^2. The cutters are driven by a crank and pitman E^2, on the forward end of this shaft. The gear E turns loosely on the crank-shaft with which it is connected or dis-connected as desired by means of a clutch *e*, sliding thereon and normally held in contact with the pinion by a spiral-spring *e′*, but held out of contact therewith by a shipper e^2 controlled by a

crank e^3 on a vertical arm e^4 turning in the frame, (see Figs. 6, 7, and 8,) thus unshipping all the mechanism by a single lever.

The reel is mounted on a post F, rocking on a pivot f, and stiffened laterally by braces f', f^2. The reel is driven by a sprocket-chain G, encircling a sprocket-wheel g, on the shaft E', and a corresponding wheel g' on a short shaft g^2, carrying a bevel-wheel g^3, driving a corresponding pinion g^4 on an upright tumbling-shaft G^2. The tension of the sprocket-wheel is regulated by a bearing-wheel G' mounted in an arm adjustable by a slot and set-screw—See Fig. 4.

Butt-rakes H', are shown as so connected by cranks h, and links h', to the inner side of the front fender H, as to move parallel therewith to act on the butts of the grain and cause them to advance as rapidly as the heads. Teeth h^2, on the under side of the handles of the butt-rakes assist this operation. The butt-rakes H' are driven from the short reel-driving shaft g^2, by means of a sprocket-chain H^2 and corresponding wheels. The tension of this chain may be varied by regulating the position of the wheel h^4, Fig. 4, mounted on the crank shaft x, as shown, that is, the wheel and crank-shaft turn in bearings in a bracket or slide-plate adjustable by means of a slot and set-screw, like the means above described, for adjusting the bearing wheel G'.

The usual platform-apron I, behind the cutting-apparatus, conveys the cut grain to an elevating-apron J, traversing rollers mounted in the frame. A series of light, parallel rods K, attached to the platform-frame below the lower elevator-roller, extend up over, close to and parallel with the upper surface of the elevator-canvas, until they reach the upper elevator-roller, over which they curve and lie close to the binding-table. They thus deliver the grain to the table, and prevent its being drawn back between the table and apron, without interfering with the proper action of the elevator. The elevator is steeper than usual, and delivers the cut grain on a substantially horizontal binder-table L, slotted as usual for the upward passage of packers M, connected by pivoted links m, with lugs on the lower arm of the binder-gear standard N, mounted and longitudinally adjustable on the longitudinal binder-frame bar B. A compressor O, is pivoted on a shaft parallel with the binder-gear standard and rocking in lugs therein. The upper arm of the binder-gear standard supports the knotter-actuating shaft, its cam and gear, the knotter, holder, breast-plate and other essentials of this portion of the binding mechanism, including the driving-gear and actuating mechanism of the binder-arm, packers and compressors.

A spur-gear p on the rear end of the actuating-shaft E', drives a smaller corresponding pinion p' on a parallel short shaft p^2, so as to increase its speed. A sprocket-chain P encircles, not only a sprocket-wheel p^3 on this shaft, but corresponding sprocket-wheels i, j, Q, respectively mounted on the rollers of the platform-apron and elevator-apron, and on a longitudinal shaft q. This shaft extends from front to rear of the frame, and carries on its forward end a sprocket-wheel R, around which a chain r runs. This chain passes under a tension-pulley r', and around a sprocket-wheel r^2, on a short shaft carrying a spur-gear R', which drives the gear-wheel S, on the knotter-actuating shaft s, of the binder-gear standard. Under this organization, all the mechanism is driven either directly or indirectly from the longitudinal actuating-shaft E'; the cutters, reel and butt-rakes being driven from its forward end; the packers, from the cranked middle portion of the shaft q; the platform-apron, elevating-apron, the binding and discharge mechanism, from the rear end of the shaft E'. The binding and compressing mechanisms are operated from the forward end of the shaft q, above mentioned.

The tongue T is secured to a bracket t, hinged to the inner front corner-piece a, of the platform-frame. A link t' connects the tongue with a crank-shaft t^2 controlled by a lever T', and detent mounted on a forward projection of the longitudinal binder-frame bar B. A brace B^5, extending upward and forward, connects the platform-frame with the forwardly-projecting end of the bar B to brace and stiffen it. A bar U, secured at its forward end to the clip u, on the bar B, to which the brace B^5 is also secured, extends backward along said bar to the front of the frame where it is bent upward at an angle of say fifty degrees, and secured just above this bend to a bracket w on the upper end of the inclined brace B^4, which extends to the shoe of the cutting apparatus, and is bent at its upper end where it is attached to the bracket w. The bar is thus firmly braced and carries the driver's seat U' on its upper end. The seat-supporting bar is also bent outward to bring the seat over the driving-wheel and between the knotting mechanism on the rear of the binder-gear standard, and its driving-gear on the front of that standard.

The operation of the machine will readily be understood from the foregoing description. The cut grain falls upon the platform-apron or carrier, which conveys it to the elevating-apron, which elevates and deposits it on the binding-table, where it is bound and where the bound bundles are discharged over the driving-wheel.

I am thus, by my improvements enabled to secure a strong and light but rigid frame, to arrange the binding-mechanism thereon compactly and conveniently between the driving wheel and elevating-apron; to arrange the driving-wheel and its supporting-arm outside the main frame; largely to employ sprocket-gearing; to drive all the mechanism directly or indirectly through the intervention of a single short counter-shaft or cross-shaft coinciding with the axis around which the driv-

ing-wheel and its supporting-arm moves in raising and lowering the machine; the rocking movements of which are readily controlled by the adjusting-lever T′, mounted on the forward end of the projecting longitudinal frame-bar.

Application, Serial No. 200,754, filed by me April 30, 1886, and sundry divisions thereof, shows a machine resembling in its details some of those hereinbefore described, but nothing constituting the subject-matter of the invention claimed in those applications is claimed herein.

I am, of course, aware that many harvesters involving the use of radially adjustable driving-axle supporting-arms, sprocket gearing, cross-shafts and longitudinal shafts, separately considered are old, and I do not broadly claim such devices singly or in combination; but, so far as I am aware, the peculiar organization herein described and claimed is new.

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

1. The combination, substantially as hereinbefore set forth, of the platform-frame; the forwardly projecting longitudinal binder-frame bar securely connected therewith; the hinged tongue; its link and crank-arm; the rocking-lever and detent mounted on the front end of the longitudinal binder-frame bar.

2. The combination, substantially as hereinbefore set forth, of the platform-frame; the forwardly projecting longitudinal binder-frame bar securely connected therewith; the hinged tongue; its link; crank-arm and rocking-lever on the front end of the longitudinal binder-frame bar; the driver's seat; and its supporting-bar or standard secured at its forward end to the projecting end of the longitudinal binder-frame bar, and at an intermediate point to the forward support of said bar.

3. The combination, substantially as hereinbefore set forth, of the transverse frame-bars or sills; the longitudinal frame-bar connecting their stubble ends; the corner-pieces uniting these bars; the projecting brackets or lugs of the front and rear corner-pieces; the short counter-shaft or cross-shaft mounted in the rear bracket; the driving-wheel; its supporting-arm or plate pivoted outside the frame concentrically with the cross-shaft, and extending in advance of the driving-axle; the supporting-arm guide mounted on the front lug; the sprocket-gearing connecting the driving-axle and cross-shaft, and arranged between the driving-wheel and its supporting-arm; the longitudinal actuating shaft or cross shaft extending through the frame both in front and rear; the crank and pitman actuating the cutters; sprocket-gearing actuating the butt-rakes and the reel-driving gearing from the front end of the crank-shaft; and corresponding gearing at the rear actuating the shafts which give motion to the platform-apron, the elevator, the packer, and the gearing by which the binder and compressor are actuated.

4. The combination, substantially as hereinbefore set forth, of the transverse frame-bars or sills; the longitudinal frame-bar connecting their stubble ends; the short counter-shaft or cross-shaft mounted on the projecting rear bracket of the frame; the driving-wheel outside the frame; its supporting arm pivoted concentrically with the cross-shaft; its front guide; the sprocket-gearing connecting the driving axle and cross-shaft; the longitudinal actuating or crank-shaft extending through the frame and driven by gearing from the cross-shaft; the elevating-apron; the butt-rakes; the binder-table overhanging the driving-wheel; the packing, compressing and binding mechanism interposed between the driving-wheel and elevator-apron; sprocket-gearing actuating the butt-rakes from the front; and corresponding gearing at the rear actuating the shafts which give motion to the platform-apron, the elevator, the packer, and the gearing by which the binder and compressor are actuated.

In testimony whereof I have hereunto subscribed my name.

LEWIS MILLER.

Witnesses:
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W. K. MEANS.