(No Model.)

6 Sheets—Sheet 1.

S. D. MADDIN.

HARVESTER.

No. 403,764.

Patented May 21 1889.

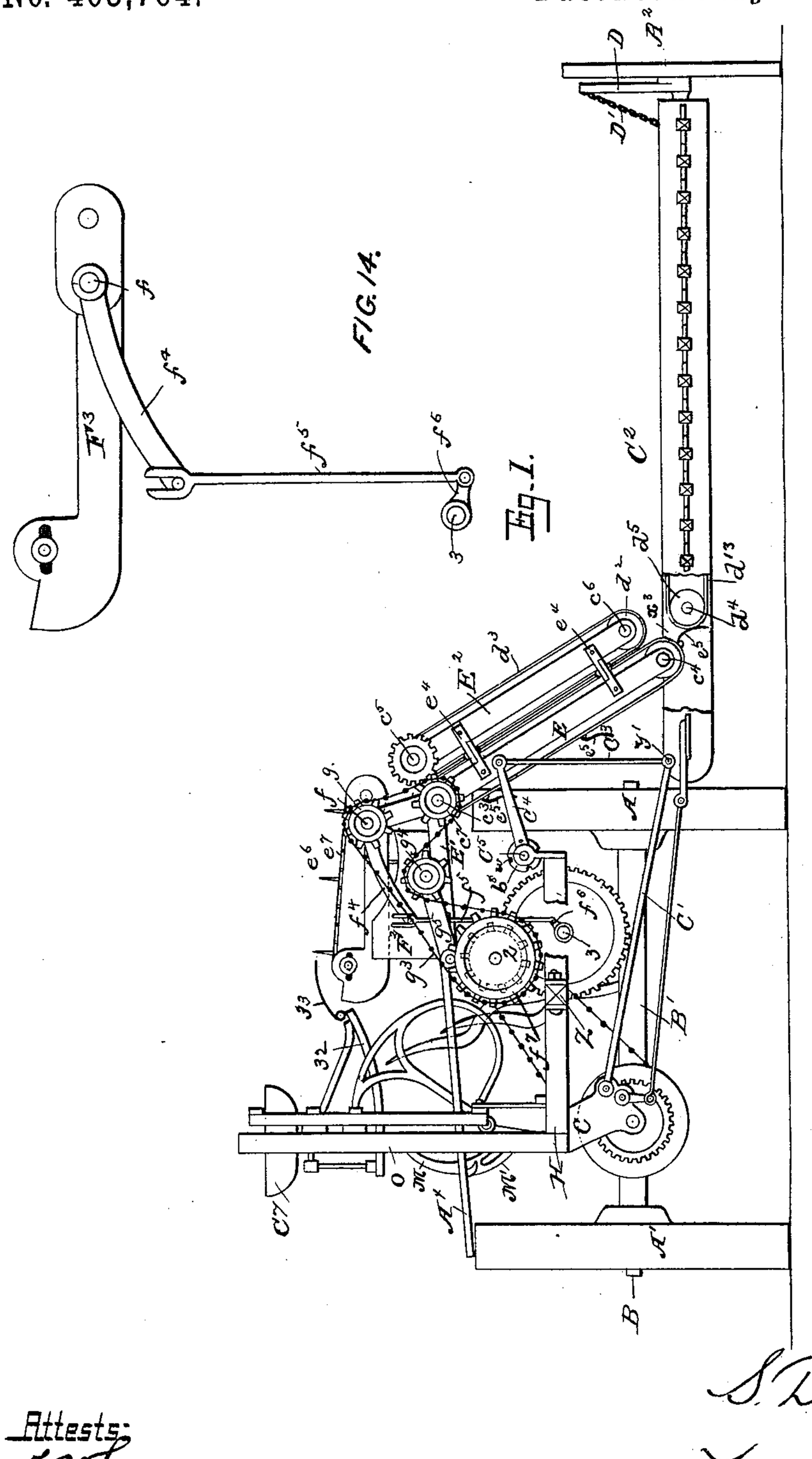

FIG. 14.

FIG. 1.

Attest:
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Wm. F. Fayers.

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HARVESTER.

No. 403,764. Patented May 21 1889.

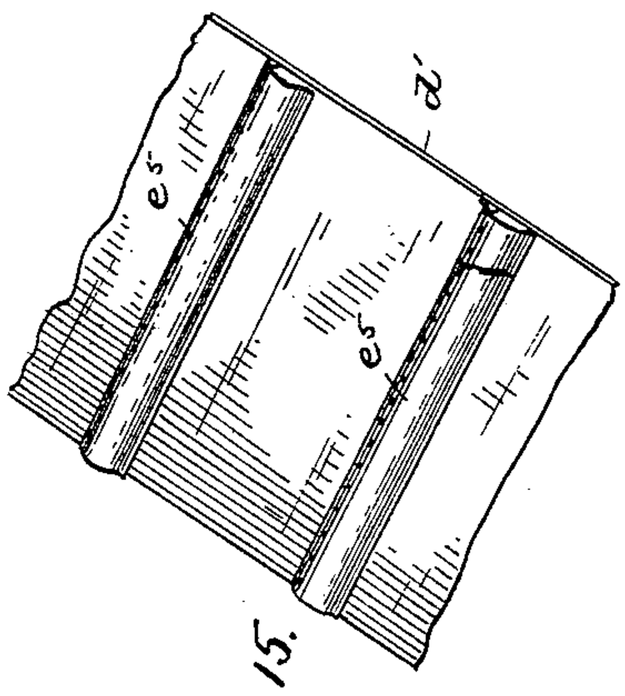

FIG. 15.

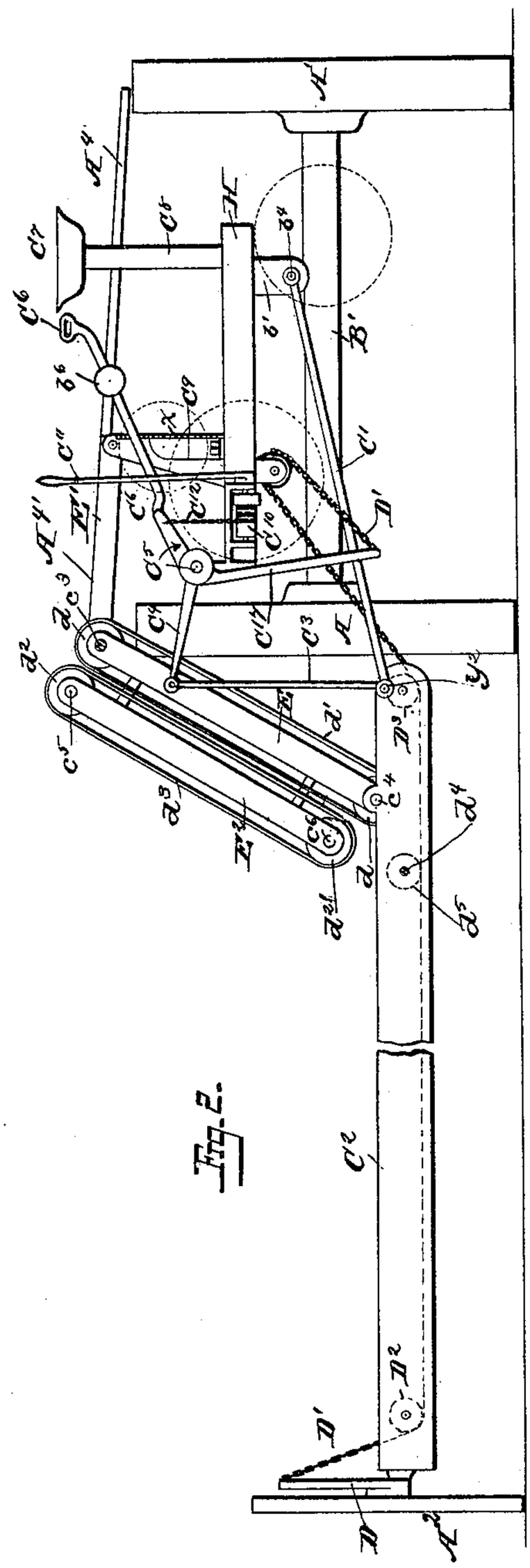

Fig. 2.

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Fig. 3.

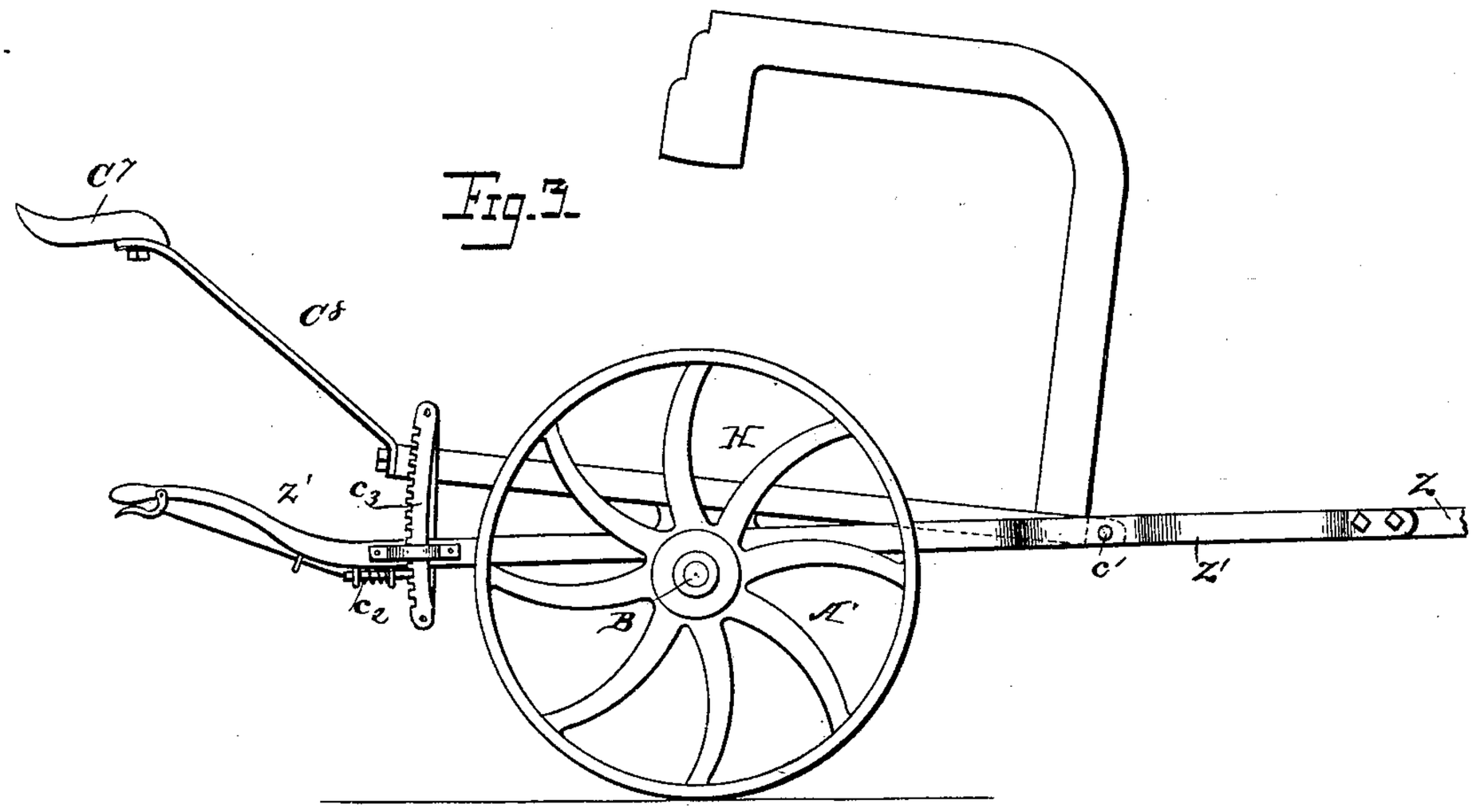
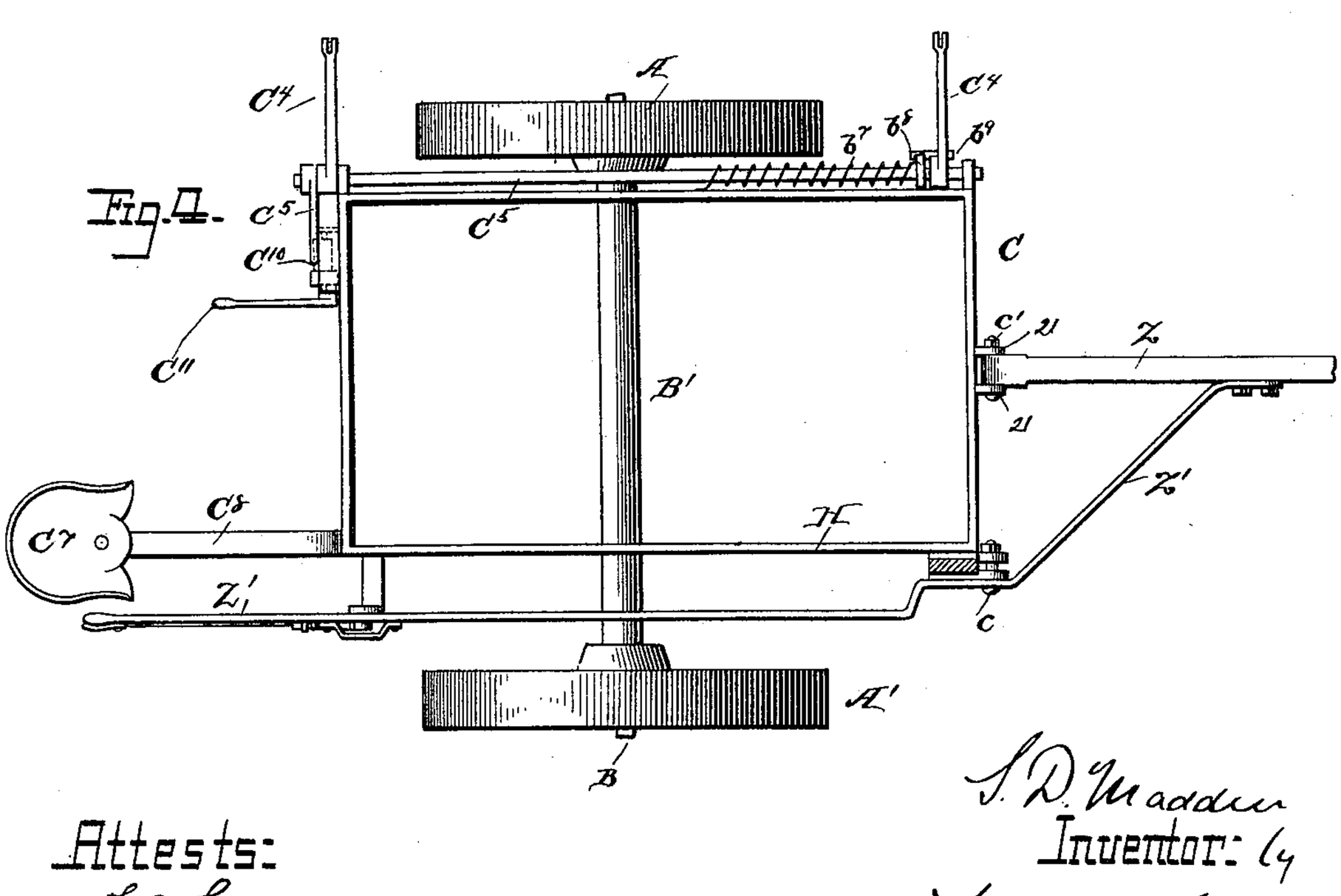


Fig. 4.



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(No Model.) 6 Sheets—Sheet 4.

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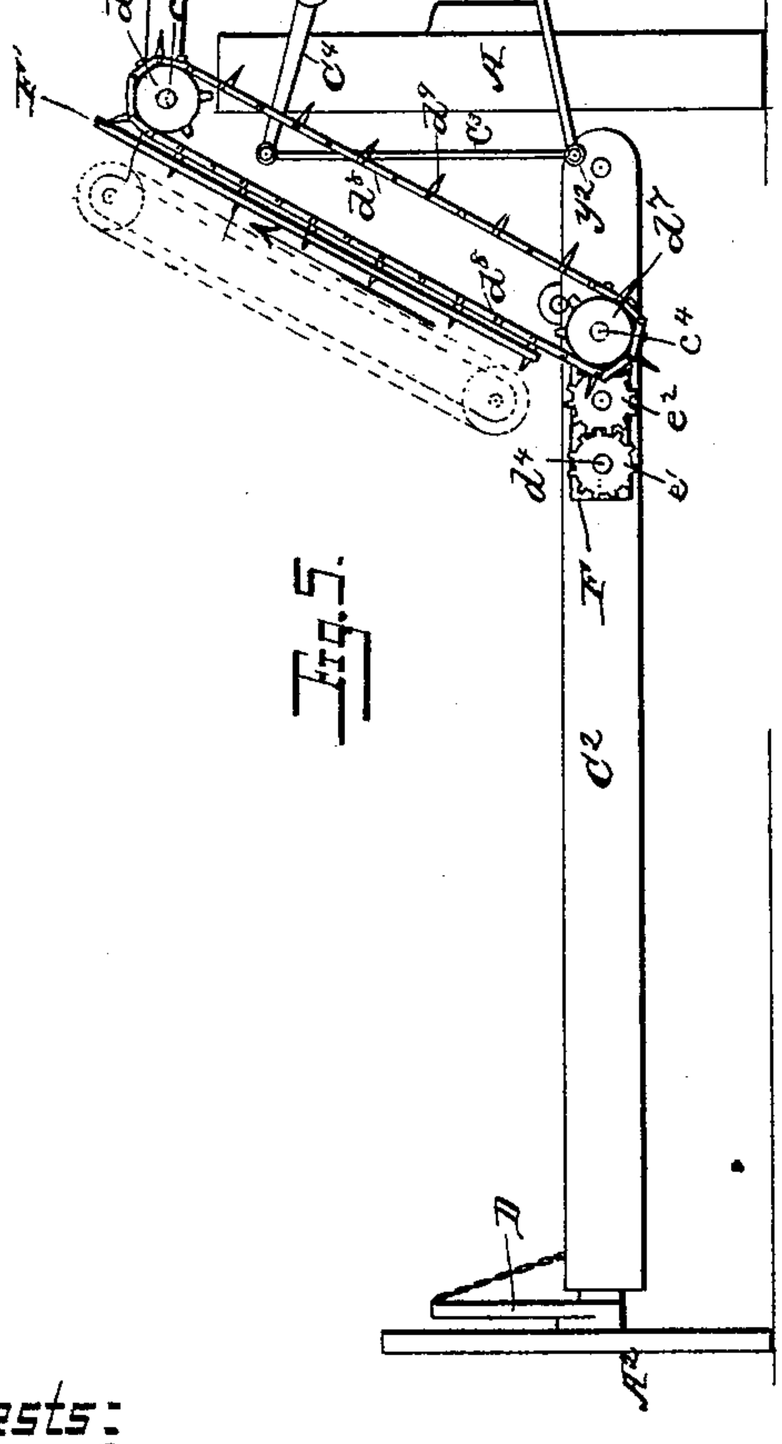

Fig. 5.

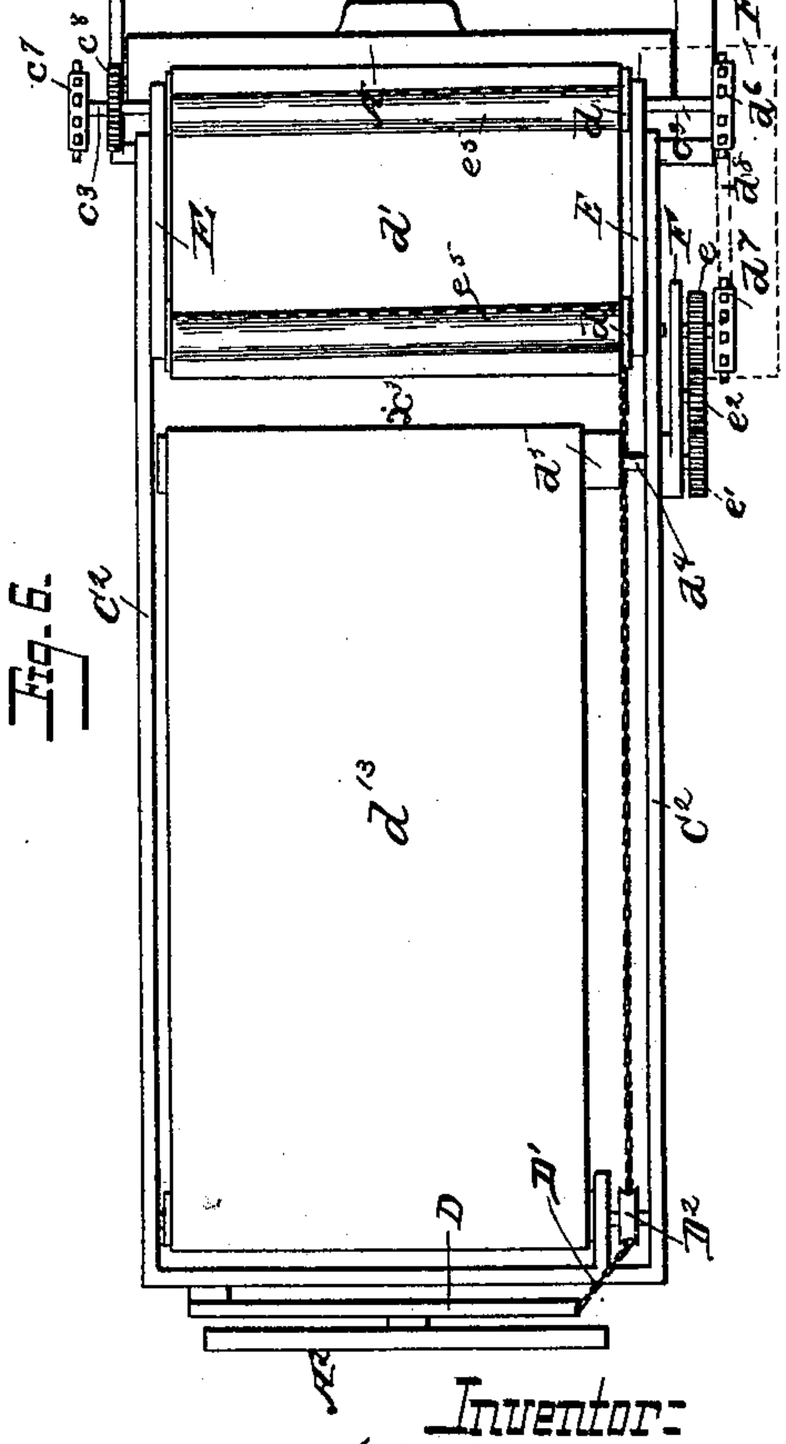

Fig. 6.

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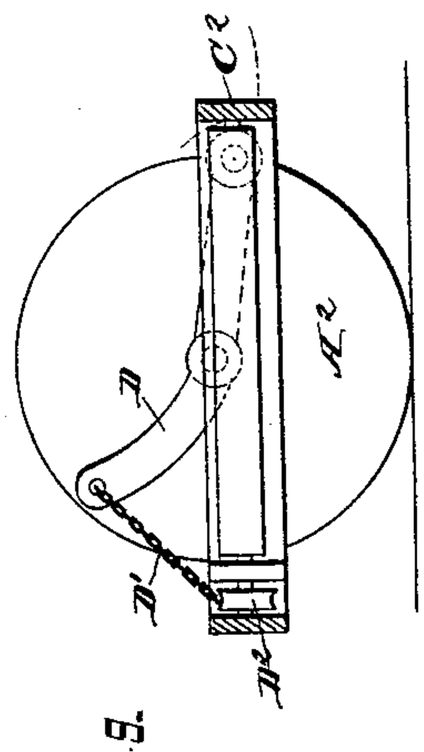

Fig. 5.

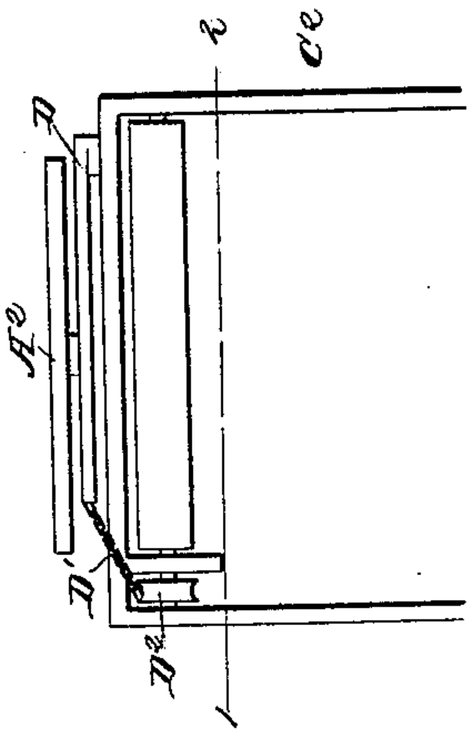

Fig. 8.

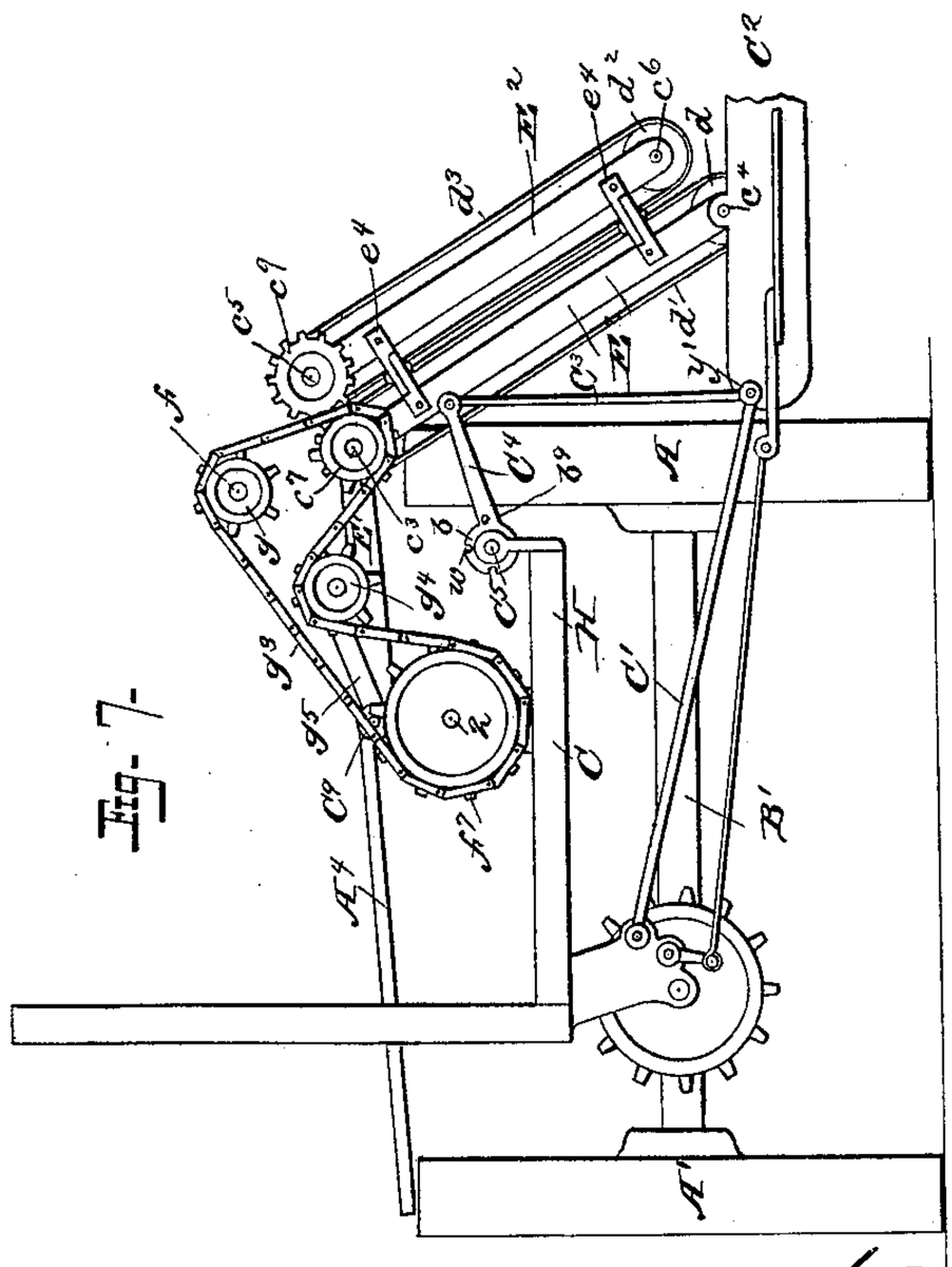

Fig. 7.

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HARVESTER.

No. 403,764. Patented May 21 1889.

Fig 10.

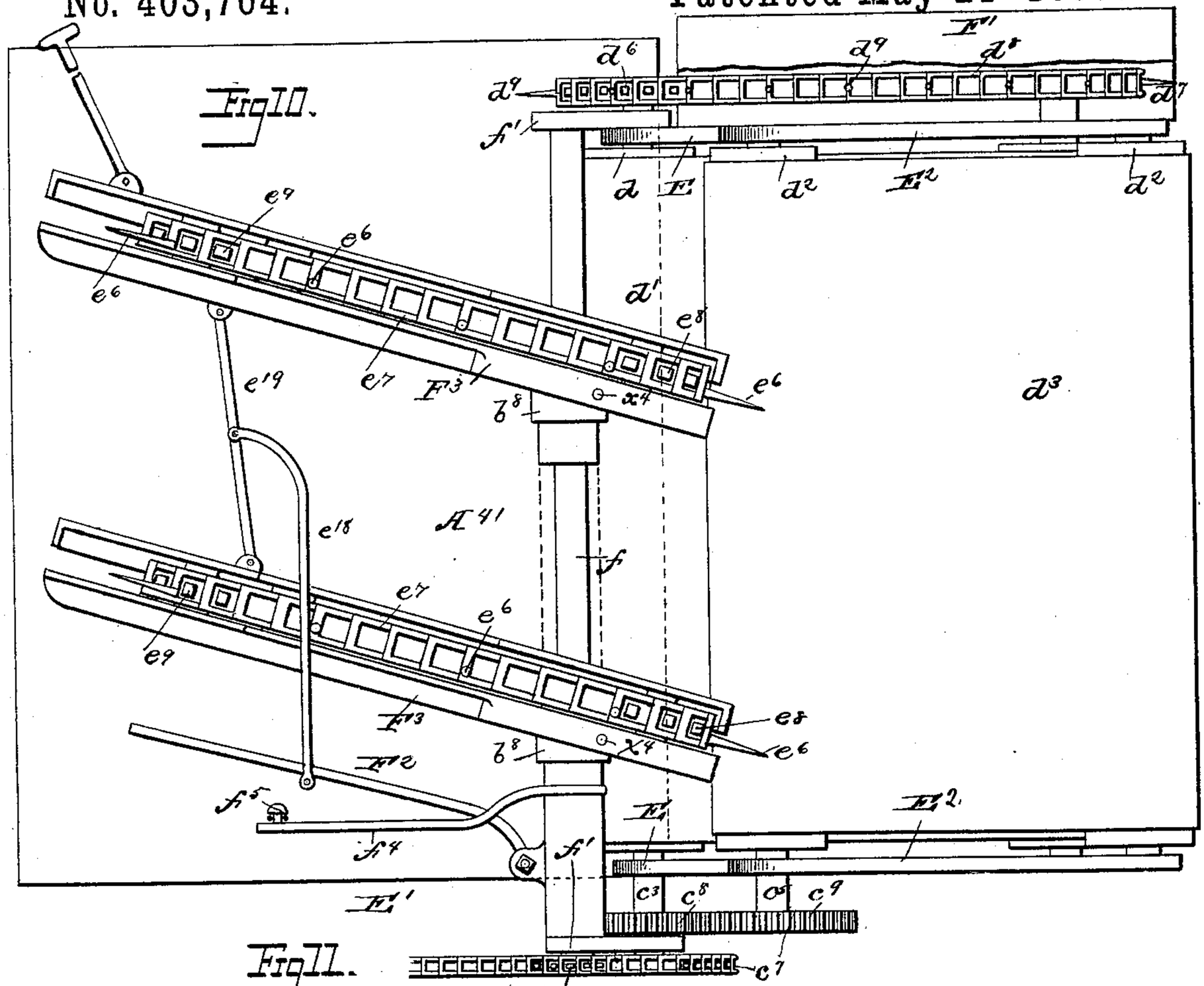


Fig 11.

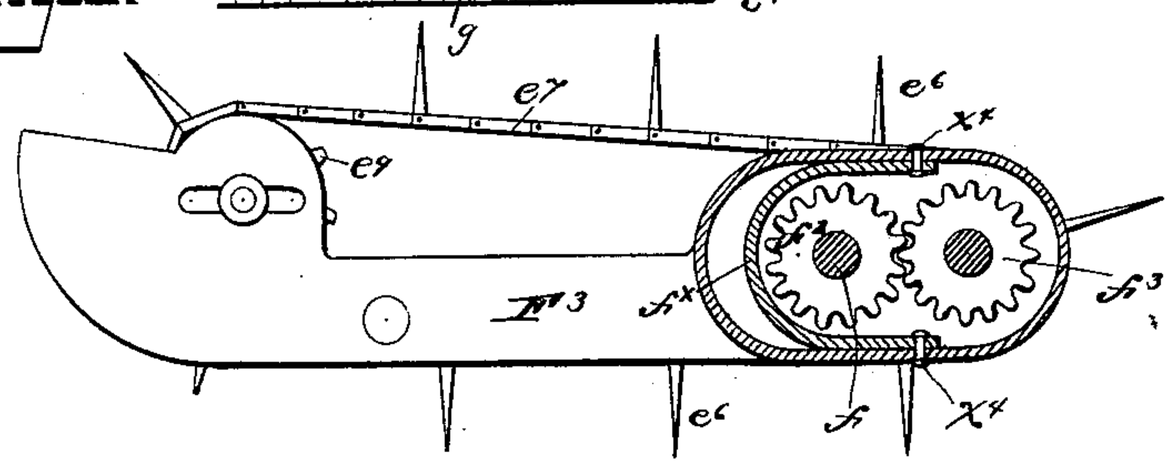


Fig 12.

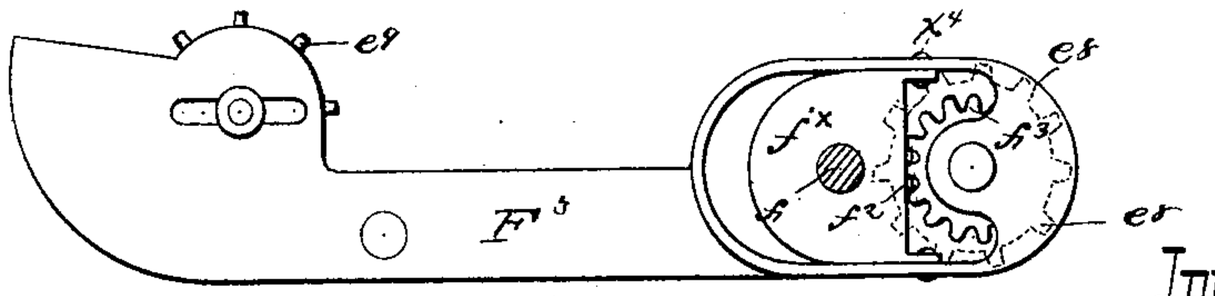
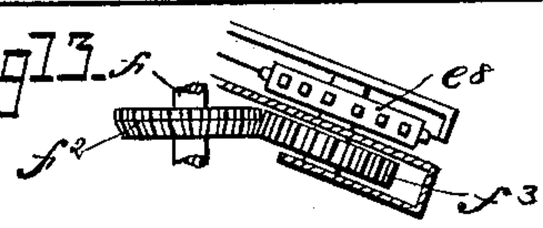


Fig 13.



Attests:

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Wm. F. Fayers.

Inventor:

S. D. Maddin by

Foster & Freeman

Attys

UNITED STATES PATENT OFFICE.

SAMUEL D. MADDIN, OF MIAMISBURG, OHIO, ASSIGNOR TO MARY MADDIN, OF SARNIA, ONTARIO, CANADA.

HARVESTER.

SPECIFICATION forming part of Letters Patent No. 403,764, dated May 21, 1889.

Application filed July 9, 1885. Serial No. 171,135. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL D. MADDIN, a citizen of the United States, residing at Miamisburg, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Harvesters, of which the following is a specification.

My invention consists in certain improvements in harvesting-machines, illustrated in the accompanying drawings and fully set forth hereinafter, having for their object to facilitate the conveying of the grain from the cutters to the binder, to secure an easy and effective adjustment of all the parts from the driver's seat, to increase the general efficiency of the implement, and overcome certain objections incident to harvesters of the ordinary construction.

In the drawings, Figure 1 is a front elevation, in part section, of a harvester embodying my improvement. Fig. 2 is a rear elevation showing the frames, supporting-wheels, and some of the parts. Fig. 3 is a side view illustrating the connection of the main frame and pole. Fig. 4 is a plan of Fig. 3. Fig. 5 is a rear elevation illustrating the connection of the frames and part of the elevating appliances. Fig. 6 is a partial plan of Fig. 5. Fig. 7 is a part front elevation. Fig. 8 is a plan showing the outer end of the grain-platform frame, supporting-wheel, and connections. Fig. 9 is a sectional elevation on the line 1 2, Fig. 8. Fig. 10 is an enlarged plan illustrating the construction of the grain-conveyers. Fig. 11 is a sectional side view of one of the conveyer-arms. Fig. 12 is a side view of one of the said arms. Fig. 13 is a sectional plan illustrating the arrangement of gears between the driving-shaft and conveyer-arms. Fig. 14 is a detached view, in side elevation, showing the mechanism for throwing out of operation the grain-conveyers. Fig. 15 is a perspective view of a portion of one of the elevator aprons or belts.

To avoid confusion I have illustrated in the different views only such of the parts as are required to facilitate the description of the machine.

The frames of the machine are supported by wheels A A′ A^2, the wheels A A′ turning upon or with an axle, B, extending through a sleeve, B′, forming part of the frame or support C of the binder, to which frame is hung one end of the frame C′, the opposite end of which is connected to the frame C^2, supporting the cutters and grain-platform, the outer end of the said frame C^2 being supported by the wheel A^2.

As the frame C′ is jointed both to the frame C and to the frame C^2, it is necessary to employ means for supporting the inner end of the latter frame. I therefore suspend the same at front and rear by means of rods or chains C^3 at the outer ends of arms C^4, connected to a shaft, C^5, turning in bearings upon the frame C, and I use suitable appliances whereby the shaft C^5 may be turned to raise and lower the inner end of the frame C^2, and I also prefer to so connect the frame C^2 with the wheel A^2 that the outer end of the frame C^2 will be simultaneously raised and lowered with the inner end, thereby maintaining the frame and cutters horizontal while permitting their adjustment to any desired height.

One means of lifting the frame C^2 consists in providing the shaft C^5 with an operating handle or lever, C^6, the end of which is adjacent to the seat C^7 of the driver, which is supported upon a spring-bar, C^8, connected to the rectangular body H of the frame C, the lever C^6 being secured in any desired position by bringing it against any one of a series of teeth or shoulders, X, upon a standard, C^9, upon the frame C. I prefer, however, to use, instead of the lever C^6, or in connection therewith, a drum, C^{10}, Figs. 2 and 4, turning in bearings upon the frame C and operated by means of a lever, C^{11}, and pawl and ratchet, and receiving a chain, C^{12}, extending to the lever C^6, so that the shaft C^5 may be turned in the direction of its arrow by winding the chain C^{12} upon the drum, and turned in a reverse direction by unwinding the chain.

To secure the simultaneous equal movements of both ends of the frame C^2, the journal of the wheel A^2 is carried by a lever, D, pivoted at the front end to the adjacent side of the frame C^2, near the forward edge thereof,

and connected by a chain, D′, passing round guide-pulleys D^2 D^3 to an arm, C^{17}, projecting from the shaft C^5. By this arrangement the turning of the shaft C^5 in the direction of its arrow, Fig. 2, directly lifts the inner end of the frame C^2, and by drawing upon the chain D′ depresses the lever D and lifts the outer end of the frame, which thereby rises and falls while maintaining its horizontal position.

I have referred to the rods C^3 as being connected at their lower ends to the frame C^2; but it will be obvious that the same effect will be secured by connecting the rods to the frame C′.

As it is important to alter the angle of the frame C^2, as well as to raise and lower it, I effect this latter adjustment by swinging the frame C upon its axle, as will be hereinafter set forth; and in order that the tilting movement of said frame C may be conveyed without lost motion to said frame C^2, I connect the two frames in front and in rear of the wheel A at y' y^2, and I brace the frame C′, so that it will not twist or spring. Thus the frame C′, Figs. 2, 5, and 6, consists of the end bars, b b, each having its outer end pivoted by bolts b^4 to lugs b', upon portions of the frame C, and being connected to a brace, b^2, the outer ends of both braces being bolted loosely to a lug, b^3, on the sleeve B′, by a bolt, b^5, in line with the bolts b^4.

To better balance the grain-platform C^2, as well as to facilitate its elevation and to maintain its weight upon the wheel A, should it strike upon the ground at points between the wheels A and A^2 and thereby be raised above its normal position, I counterbalance the weight of said platform C^2 to a greater or less extent by means of a counterbalance weight or spring. Thus a weight, b^6, may be secured adjustably to the lever C^6 in such a position as to nearly counterbalance the weight of the inner end of the frame C^2, or a spring, b^7, Fig. 4, may be bolted to the frame C at one end and at the other to a disk, b^8, Figs. 1 and 4, turning upon the shaft C^5, and provided with notches w, adapted to receive a detachable pin, b^9, passed through a hole in the arm C^4, so that the said disk may be turned to apply any desired tension to the spring, and then secured in place by means of the pin, the spring acting in the same manner as the weight. By this construction it will be apparent that the weight of the platform will be maintained at all times upon the wheel A.

The tilting of the frame C is effected by pivoting the pole Z, Figs. 3 and 4, to the front of the frame C by a bolt, c', which passes through ears 21 21, and by operating upon an arm or extension, Z′, of the pole to raise and lower the same. This extension is carried to one side of the binder-frame below the binder-table in the form of a bent plate pivoted at c to a projection upon the frame C, in line with the pivot c' of the pole, and carried parallel to the side of the frame C and bent at the end to form a handle extended to a position adjacent to the driver's seat, a bolt, c^2, carried by the lever-extension, serving as a means of locking the same in any desired position upon a curved lock-plate, c^3, secured to the frame C. The arm Z′ thus serves not only as a lever, but as a brace to the pole, of which it constitutes an extension. The driver thus by manipulating the lever C^{11} can raise and lower the grain-platform frame vertically, and by manipulating the lever Z′ can tilt it so as to carry its forward edge to or from the ground, thus imparting any desired angle to said platform.

As it is essential to retain the relative positions of the grain-platform frame C^2 and the binder, while permitting the adjustments before described, I support the binder (see Fig. 1) between the wheels A and A′ upon the frame C, so that the binder will move with said frame C and with the other frames connected to it, and I arrange the elevators so as to convey the grain from the grain-platform C^2, over the wheel A, to the upper edge of the table A^4 of the binder, whatever may be the relative positions of said binder and platform C^2, and I extend the said table A^4 over the wheel A′, so that the grain discharged from the table will fall outside of said wheel.

The grain-elevator may be of any suitable construction. As shown, it consists of two frames, E E′, pivoted together, and frame E^2, overlying and hinged to the frame E. The frame E is pivoted to the frame E′ at its upper end and at its lower end to the grain-platform frame C^2, while the frame E′ is pivoted at its outer end level with the table A^4 between two standards, C^9, upon the frame C. The pivotal shafts c^3 c^4 of the frame E carry the drums d d, Fig. 2, round which passes the elevator-belt d', and the frame E^2 carries shafts c^5 c^6, supporting drums d^2 d^2, round which passes an elevator-belt, d^3, between which and the belt d' the grain is carried upward from the grain-platform carrier-belt d^{13} and delivered onto the inner end of the binder-table A^4.

The power to turn the elevator-belts is applied to a sprocket-wheel, c^7, Figs. 7 and 10, upon the forward end of the shaft c^3, as will be hereinafter described, and gear-wheels c^8 c^9 upon the shafts c^3 c^5 intermesh, so as to insure the coincident movements of the two belts d' d^3.

Motion is transmitted from the upper shaft, c^3, of the elevator E to the shaft d^4 of the grain-platform carrier-belt roller d^5, (see Figs. 5 and 6,) through the medium of sprocket-wheels d^6 d^7 and a sprocket-chain, d^8, connecting said wheels and carrying pins d^9. The sprocket-wheel d^6 is mounted upon the projecting end of the shaft c^3, while the sprocket-wheel d^7 turns upon a journal which projects from a bracket, F, (see Fig. 6,) secured to the grain-platform frame C^2, and carries a gear-wheel, e, which imparts motion to a gear-wheel, e', through the medium of an

intermediate gear, e^2, the gear e' being upon the shaft d^4 of the carrier-belt roller d^5.

The sprocket-wheel d^6 is placed at some distance beyond the side of the frame E, Figs. 6 and 10, and an inclined guard-plate, F′, slotted for the passage of the pins d^9, extends from the side of the frame E beyond the chain d^8, and constitutes, practically, an extension of the inclined belt of the elevator, so that the pins d^9 of the sprocket-chain will co-operate with the elevator-band in lifting long grain. The sprocket-chain d^8 therefore serves the double purpose of an elevator and a band communicating motion to the grain-platform carrier-belt roller d^5.

In order that the grain may be carried up between the two elevator-belts and extend beyond the frame E^2 to the sprocket-chain, it is necessary that the frame E^2 shall be connected to the frame E only at the forward end, and in order that the upper elevator-belt may always press upon the grain, whether the body of grain be thick or thin, and avoid too great a pressure when the body of grain is thick, I connect the frames E E^2 by means of hinges e^4, Figs. 1 and 7, which maintain the frames in proper relative position, but permit the upper frame to be swung outward to accommodate the amount of grain passing through the elevator, and also permit the rear of the upper frame to swing farther away from the lower frame to accommodate the heads of the grain.

As there is necessarily a space between the adjacent ends of the grain-platform carrier-belt d^{13} and the elevator-belt d' at the point x^3, (see Figs. 1 and 6,) stalks of grain frequently pass through to the ground. To avoid this waste, I provide the band d' with a series of flaps or flexible strips, e^5, of leather, rubber, or other suitable material, (see Figs. 1, 6, and 15,) each extending across the band and secured thereto at one edge by rivets or equivalent means, which flaps are thrown outward by the movement of the band, so as to close the opening x^3 as they pass through the same, and catch and throw back any of the stalks which would otherwise escape, thereby insuring the lifting of the entire amount of grain that is cut.

The grain discharged from the elevator is thrown onto the upper end of the table A^4, down which it is carried by the teeth e^6 of conveyers e^7, arranged above the table and carried by sprocket-wheels e^8 e^9, (see Figs. 10, 11, and 12,) grain thus being fed forward to a position to be caught by the grain-binder packers. As the grain varies in length, it is of course desirable to shift the same, in order that it may be brought to the proper position to be operated upon by the packers and binding-arm, and this has ordinarily been done by means of a guide-plate, F^2, to engage the butts of the grain, which plate is set at an angle to a greater or less degree, according to the extent to which the grain is to be shifted. It has been found, however, that the grain does not move freely to its required lateral position under the action of such a guide-plate. To overcome this defect, I so hang the conveyers above the table A^4 or the movable platform A^{41}, carried by the frame E′, that they may be set to the same angle as the guide-plate, so as to feed the grain positively at any required angle upon the table.

Different means may be employed for suspending and shifting the conveyers. I have shown one which I have found to be effective, the same consisting of slotted arms F^3, each carrying at its opposite ends, respectively, the sprocket-wheels e^8 e^9, which support and operate one of the conveyers e^7, and each pivoted at points x^4 between said sprocket-wheels to a hub or casing b^8, mounted upon a shaft, f, so that the frame F^3 and conveyers may be swung to any desired angle above the platform by means of a handle extending to within convenient reach of the driver and provided with any suitable locking device, the two arms being connected by a link, e^{19}, to each other, and the link being connected by a rod, e^{18}, to the guide-plate F^2, so that both conveyers, frames, and the guide-plate F^2 will be maintained parallel in all positions.

The sprocket-wheels e^8 e^9 are driven from the shaft f, which is carried by standards f', which project from the frame E′, by pinions f^2 within each of the casings $f^\times$ upon said shaft, each of which pinions gears with a pinion, f^3, upon the shafts of the sprocket-wheels e^8. By this arrangement each conveyer-arm F^3 is hung to the shaft f, so that it may be swung thereon to bring the conveyers over the table A^{41}, or to carry them away from the said table, while the arms may be set to any desired angle without disconnecting the gears f^2 f^3, since the pivots x^4 are substantially in line with the engaging portion of the gear-wheels, the guide-plate being kept parallel to the arms.

In order to insure a more uniform action of the gears, the former f^2 are provided with teeth having beveled corners, which engage the gears f^3 in the manner of bevel-gear when the conveyers are swung to one side, as shown in Fig. 13.

The suspension of the grain-platform frame C^2 from the binder-frame C by adjusting means renders it necessary to connect the elevator flexibly with the binder-table through the medium of a movable frame E′, as described, and this flexible connection has the advantage of permitting said platform-frame C^2 to be thrown upward to nearly a vertical position, so that the machine may be moved through a narrow gate or passage way without disconnecting or interfering with any of the parts, so that when the grain-platform C^2 is turned down to its horizontal position all of the parts will be in working condition, and by placing the conveyers upon the frame E′ the adjustment of the parts above described

can be effected without interfering in any way with the operation of said conveyers.

As it is not desirable to feed the grain as rapidly toward the packers during the time that the gavel is being packed and compressed as at other times, I provide means for lifting the conveyers or arresting their action at such times as it is desirable to arrest the flow of the grain. The movements of the conveyers may be arrested by stopping the rotation of the shaft *f;* but I prefer to continue the movements and to arrest the action of the conveyers by lifting their outer ends away from the table A^{41}. One means of effecting this is illustrated in the drawings, (see Figs. 1, 10, and 14,) and consists in connecting an arm, f^4, projecting from the casing b^8, by means of a rod, f^5, to a crank, f^6, upon a shaft driven by or from any moving part of the machine. As shown, the said shaft is a prolongation of a shaft, 3, so that at each revolution of the latter the shaft *f* is rocked and the conveyers lifted from the table. While I have shown the arm f^4 as projecting from but one of the casings or hubs b^8, it will be understood that said casings may be connected together by a sleeve. (Shown in Fig. 10 by dotted lines as inclosing the shaft *f*.)

In order that the conveyers can be turned back and away from the table without necessitating the withdrawal of connecting-bolts, I use a detachable connection with the operating parts. Thus I fork the end of the rod f^5, so as to receive a pin upon the arm f^4, which pin can thus slip from its position between the fork when the conveyers are turned back, and can be inserted and brought into operative connection with the crank f^6 when the conveyers are brought into working position.

Motion is imparted to the shafts c^3 and *f* from the shaft 2, Fig. 7, which carries a sprocket-wheel, f^7, round which and round sprocket-wheels *g* and c^7 passes a sprocket-chain, g^3, the said chain passing also over a tightening-roller, g^4, hung to an arm, g^5, pivoted to the forward standard, C^9, and borne upon a spring, (not shown,) which tends to raise it and maintain the chain taut, whatever may be the position to which the frame E′ is adjusted.

It will be evident that the frames above described may be constructed of wood or metal in different ways, so as to impart the desired rigidity, and that the adjusting devices, gears, and connections may be somewhat varied without any change in the main features of the parts described, whereby the platform-frame may be adjusted by the driver to any desired height without altering its horizontal position and tilted without twisting by the tilting of the binder-frame, and whereby the grain may be carried over the inner wheel and delivered upon the table and directed to any desired position upon the latter, and whereby the feeding of the grain onto the table may be arrested at intervals.

It will be seen that the binder occupies practically a stationary position between the wheels A and A′, while the grain-platform frame can float over the ground at any angle, and that the said frame may be adjusted vertically independently of the binder, so that the movements of the latter in binding and discharging the grain are not in any way affected by the position of the grain-platform frame, as results when the latter also carries the binder.

To cover the grain as it is being moved forward by the packers, I use a guard, 33, which is hinged to a shield, 32, carried by the overhanging arm O of the binder, (see Fig. 1,) so that the said guard may be thrown back out of the way in order to expose the table.

It will be evident that many of the devices above described may be used in connection with binders of different constructions.

While I have shown and described in this application features also shown and claimed in a separate application, Serial No. 147,652, I do not here make any claim to the same.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. The combination, with the grain-platform frame, of a grain-elevator composed of upper and lower frames connected together at their forward sides only by means of hinges, which permit the upper frame to accommodate itself to the mass of grain being elevated, and each provided with a positively-driven traveling grain-carrying apron, and driving-gears connecting the upper apron-drums at the forward sides of the elevator-frames, whereby the upper frame may move away from the lower frame at the rear side to accommodate the grain without disengaging the driving-gears, substantially as described.

2. The combination of the platform-frame provided with a horizontal grain-carrying apron, an inclined elevator-belt, between which and the horizontal apron there is an open throatway, and loose flaps upon the elevator-apron passing through the said throatway, substantially as set forth.

3. The combination, with two traveling grain-carrying aprons arranged at angles to each other and with their ends adjacent to each other and separated by a throatway, of flexible strips e^5, carried by one of the said grain-carrying aprons to bridge the said throatway, substantially as described.

4. The combination, with the binder-frame and a platform-frame, of an intermediate frame pivotally connecting the binder and platform frames and composed of lateral bars *b*, pivoted both to the binder-frame and to the platform-frame, and the diagonal bars b^2, arranged between the bars *b* and pivoted to the binder-frame in line with the pivotal connections of the bars *b* therewith, substantially as described.

5. The combination of the table upon which

the grain is delivered by the elevators, the shaft *f*, arranged above the table, the bracket b^8, supported on the shaft, the frame F^3, pivotally connected with the bracket, gear-wheels arranged between the said shaft and a shaft carried by the said frame, and a conveyer-chain driven by the last-named shaft, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL D. MADDIN.

Witnesses:
AMOS K. CLAY,
S. M. UMBENHAUER.