

(No Model.)

3 Sheets—Sheet 1.

L. W. ELLIS.
BUNDLE CARRIER FOR HARVESTERS.

No. 480,944.

Patented Aug. 16, 1892.

Fig. 1.

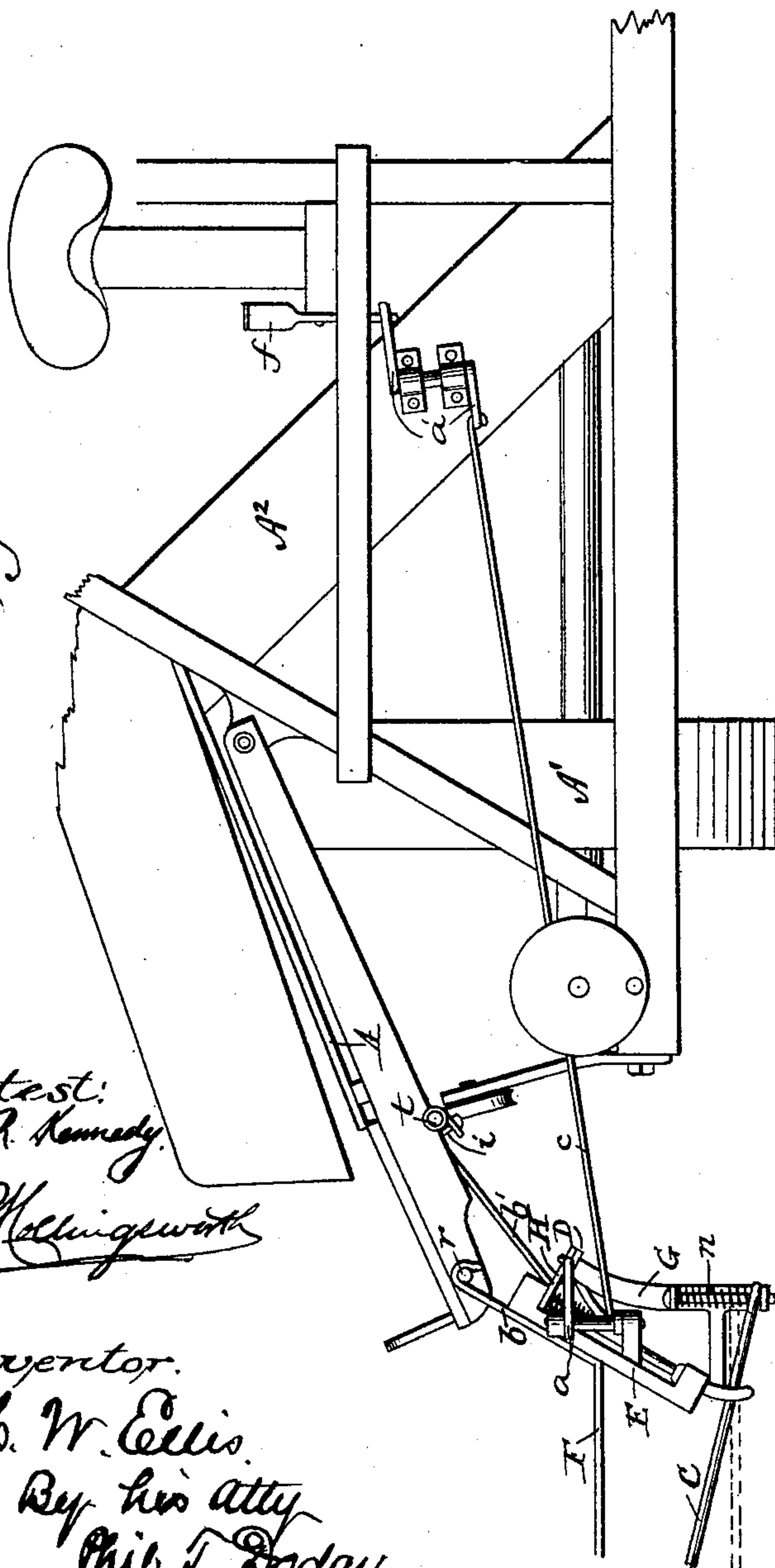
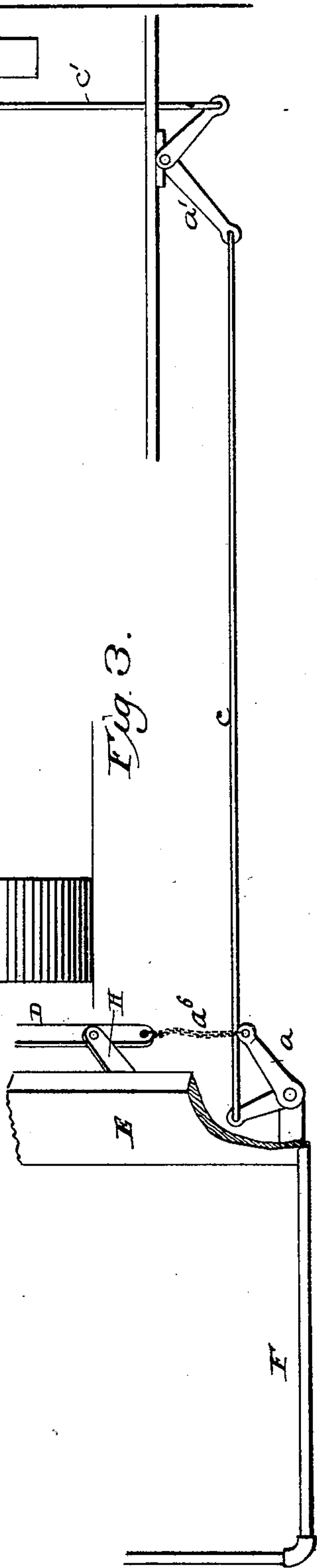


Fig. 3.



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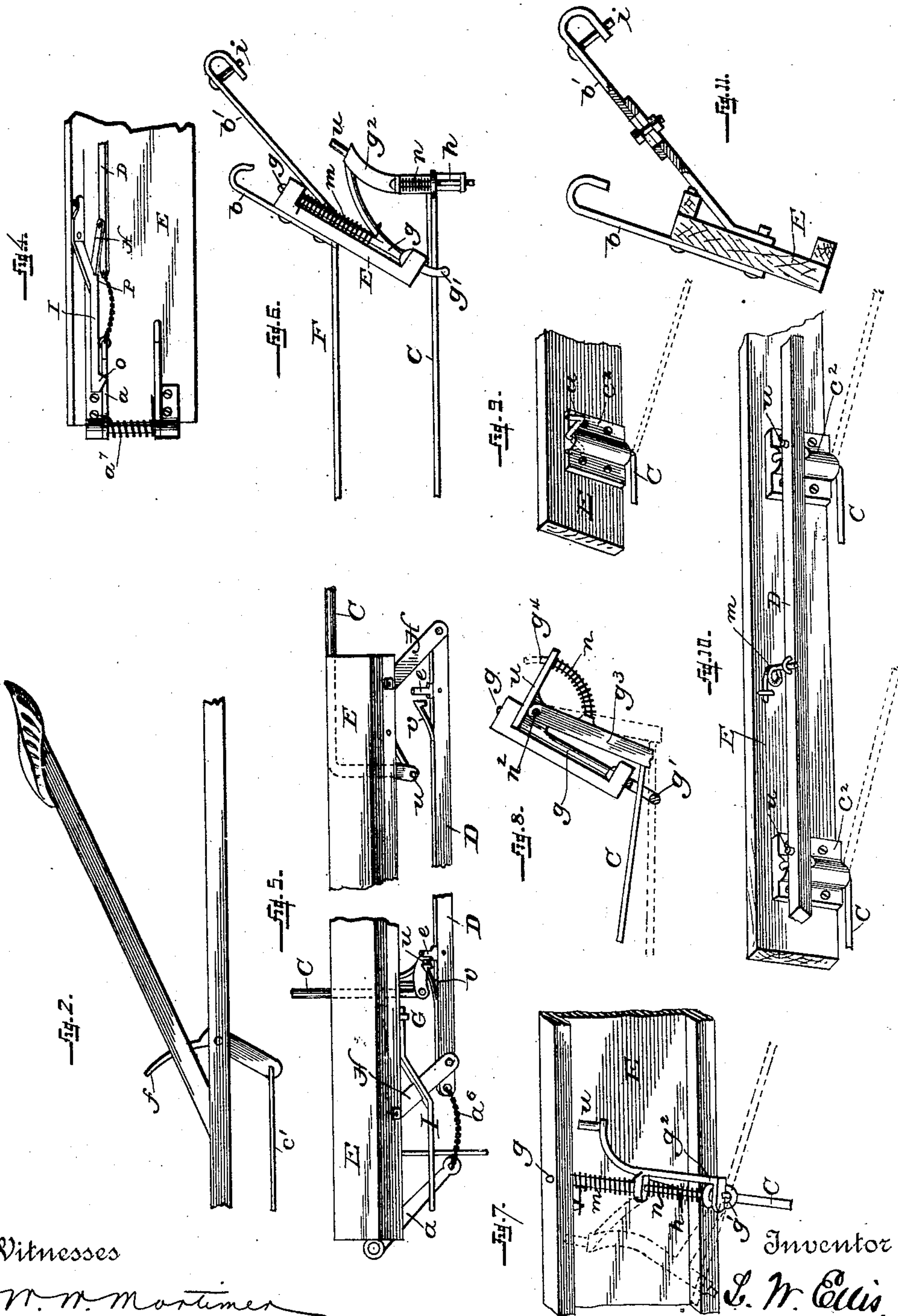
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Witnesses

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(No Model.)

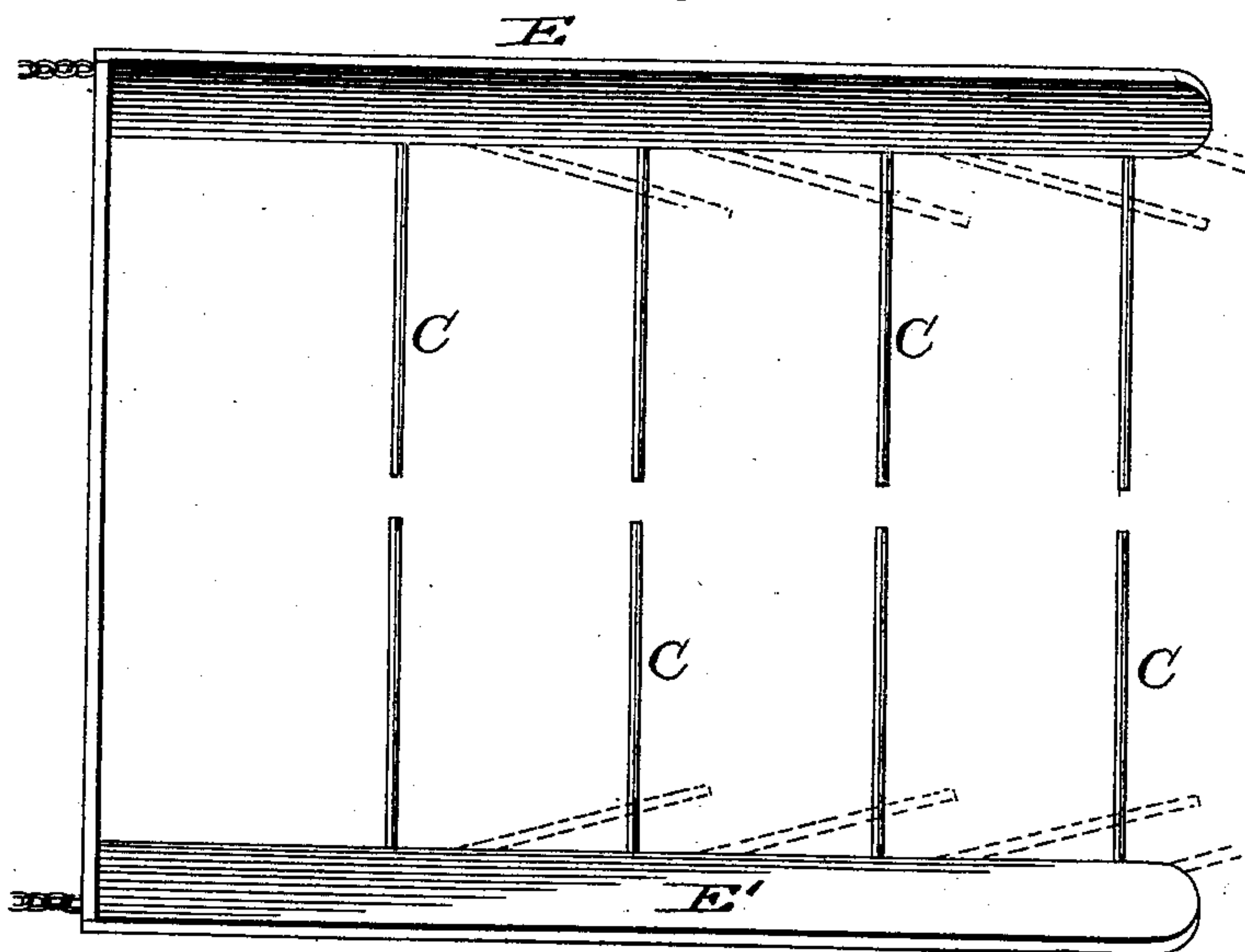
3 Sheets—Sheet 3.

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Fig. 1a.



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UNITED STATES PATENT OFFICE.

LUCIEN W. ELLIS, OF ANAMOSA, IOWA, ASSIGNOR TO WILLIAM DEERING,
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BUNDLE-CARRIER FOR HARVESTERS.

SPECIFICATION forming part of Letters Patent No. 480,944, dated August 16, 1892.

Application filed November 20, 1885. Serial No. 183,395. (No model.)

To all whom it may concern:

Be it known that I, LUCIEN W. ELLIS, a citizen of the United States, residing at Anamosa, in the county of Jones and State of Iowa, have
5 invented certain new and useful Improvements in Sheaf-Carriers for Grain-Binding Harvesters, of which the following is a full, clear, and exact specification.

My invention relates to that class of devices
10 which are applied to grain harvesting and binding machines for the purpose of carrying the bundles or sheaves as bound until they have accumulated in sufficient number to form a shock or a considerable portion thereof
15 and then discharging them in a heap; and the object of the invention is to produce a simple, light, and easily-operated device for this purpose, which may, if desired, be attached directly to the binder, and which shall be adapted
20 to discharge the bundles by a movement of the carrying-fingers downward, backward, and obliquely inward toward the side of the harvester.

In the accompanying drawings, Figure 1
25 represents a front elevation of the device attached to the harvester. Fig. 2 is a side elevation of the seat and foot-board of the harvester with the trip-lever attached. Fig. 3 is a plan view of the device for actuating the fingers and discharging the bundles, together
30 with a portion of the bundle-carrier. Fig. 4 is a side elevation of a device for locking the carrier-fingers in operative position. Fig. 5 is a plan view of a portion of the carrier with the fingers in two different positions. Fig. 6
35 is a front elevation of the carrier in one of its forms. Fig. 7 is an elevation from the inner or grain side of a modified form of the pivotal support for the carrier-fingers. Fig. 8 is
40 a front elevation showing the pivotal support in still another form. Fig. 9 is a perspective view showing the finger and its support in the most simple and preferred form. Fig. 10 is a perspective view showing two fingers of
45 the form represented in Fig. 9 and their actuating device. Fig. 11 is an end view, partly in section, showing a modified support for the side-board of my carrier. Fig. 12 is a top plan view showing the carrier with two series of
50 fingers.

Like letters indicate like parts.

Referring to the drawings, A represents the binder deck or table, forming the lower portion of an ordinary grain-binding machine and located at the outer side of the main supporting-wheel A', over which the unbound
55 grain is carried by an ordinary elevator A² from the harvester-platform to the binding mechanism. The harvester, elevator, and binder may all be of ordinary construction, and form no part of my invention. The grain
60 is bound in an ordinary manner upon the deck or table A and the sheaves delivered successively from the lower stubble edge of the table.

My carrier comprises in each of its various forms sheaf-sustaining fingers journaled in inclined axes or bearings to cause them to move downwardly and backwardly in an oblique path and sidewardly toward their support
65 in discharging their load, which bearings are supported by a side board or bar lying in a fore-and-aft direction beneath the delivery edge of the binding-table, and sides, limits, guards, or means of some kind to prevent the bundles when discharged onto the
70 carrier from being carried by their momentum or the jolting of the harvester beyond and off of the carrier-fingers. I will here say that I do not desire or intend to limit myself
80 to any particular kind of guard, side, limit, or means to prevent the lateral displacement of the bundles, as I intend to claim the carrier broadly and generically when provided with carrier-fingers mounted on inclined pivots or axes permitting the fingers to fold rearwardly, downwardly, and sidewardly in discharging, which I regard as the novel and essential feature of construction of my carrier,
85 whatever provision be made to prevent the lateral escape of the sheaves from the fingers. The side-board is preferably set, as shown in Fig. 1, with its face at an inclination of from twenty to thirty degrees to the vertical and is suspended from the binder at each end by
90 means of arms or brackets *bb'*. I make these brackets, which are firmly attached at their outer ends to the side-board, with hooks at their inner ends, as shown in Figs. 1 and 6. The hook of the outer bracket *b* may be engaged upon the stud *r* on the binder and the
100 hook of the inner bracket *b'* engaged upon the

rod *t*, forming, as usual, a part of the binder-frame and a support therefor. The bracket *b'* is secured in position on the rod *t* by a pin or key *i*. It may be made, as in Fig. 11, of two parts lapped upon each other and provided with slots to receive a connecting-bolt in order that its length may be varied to change the inclination of the side-board, and thereby the position of the fingers.

In its most simple form my carrier is constructed as shown in Figs. 9 and 10, each of the carrier-fingers *C* being formed of a rod or wire having its inner end turned upward to form a journal or axis, which is seated in a bearing-plate *c*², rigidly attached to the side-board *E*. The upright journals of the fingers have an inclination substantially corresponding with that of the board *E* in a vertical plane at right angles to the length of the board, or, in other words, at right angles to the direction in which the machine advances. It will be observed that these journals are inclined not only in relation to the perpendicular, but also in relation to the bodies of the fingers *C*. When, therefore, the fingers are projected laterally from the machine to receive the bundles, they stand in a substantially horizontal position. Each finger may, however be swung rearward at its outer end around the journal at its inner end, and in consequence of the inclination of this journal the outer end of the finger in moving rearward also moves downward and inward toward the side of the harvester. Thus, it will be perceived, the fingers swing rearward, downward, and inward around individual axes in paths which are oblique to the surface of the ground. Owing to the fact of their swinging rearward about individual axes, they close not only toward the machine, but also toward each other, each finger folding closely against the side of the next, so that the entire series of fingers is closed together in compact form at the side of the machine. This capacity of the fingers to fold rearward, downward, and inward is of the essence of my invention. The joints by which they are supported to admit of these peculiar movements may be variously constructed. A few of the various joints adapted to permit this movement will be hereinafter described. There are also others their mechanical equivalents which will readily suggest themselves to any mechanic skilled in the art after reading this specification.

For the purpose of controlling the pivotal or swinging motion of the fingers I provide the journal or axis of each finger with a crank-arm and connect the series of crank-arms by a bar or similar device to compel their movement in unison. In the form of finger already referred to (shown in Figs. 9 and 10) the upper end of the journal is bent to form a crank *u*, the finger, its journal, and the crank being in this instance formed in one piece.

Fig. 10 illustrates the connecting-bar *D*,

provided with holes in which the cranks *u* are snugly seated. A spring *m* is fastened at one end to the side-board *E*, coiled at its middle, and passed at its opposite end through an eye on the connecting-bar, as shown in Fig. 10. This spring, urging the bar rearward, acts through the cranks to hold the fingers normally in their extended or receiving position and to return them thereto after they have been swung to the rear to discharge the load. In order to swing the fingers rearward to the dumping or discharging position, I propose to connect with the bar *D* operating or tripping devices of suitable character under the control of the driver. A simple mechanism to this end is shown in Figs. 1, 2, and 3, in which it will be seen that the connecting-bar *D* is connected by a chain *a*⁶ to an elbow-lever *a*, mounted on the forward end of the side-board *E*. From this lever a rod *c* extends to a second elbow-lever *a'*, mounted on the forward part of the harvester and connected in its turn by a rod *c'* to the lower end of a centrally-pivoted lever *f*, mounted on the customary seat-plank of the machine in position to be conveniently operated by the driver while occupying his seat. When the upper end of this foot-lever is pressed forward, the fingers will swing positively toward the rear. The discharge of the bundle therefrom is due not only to the fact that the fingers fall at the outer end, so that the bundles tend to slide therefrom, but also to the fact that the fingers swinging laterally toward the machine and toward each other trail sidewise from under the bundles as the latter pass successively to the ground. Through the described inclination of the journals or axes the fingers tend to swing rearward by reason of their own gravity and that of the load as soon as they are turned slightly rearward from their receiving position; but when in the receiving position there is little or no such tendency.

Instead of connecting the spring *m*, which returns the fingers to their normal or receiving position, to the bar *D*, as above described, springs may be applied for the same purpose to the axes of the individual fingers, as hereinafter explained.

In order to return the lever connections, commonly known as the "tripping devices," to their normal position, I recommend the application of a returning-spring *a*⁷, as shown in Fig. 4. This spring *a*⁷, of spiral form, is mounted on the journal of the lever *a*, with one end bearing on the lever and the other seated against or fixed to the side-board *E*.

While I recommend for general use the fingers having the inclined axes integral therewith, as above described, I will now describe other and equivalent forms of pivotal supports by which the fingers may be given the desired motion.

In the form shown in Figs. 6 and 7 a journal or axis *g* is seated in an inclined position to turn in bearings on the back of the side-

board E. At its lower end this journal is provided with an eye g' , through which the carrier-finger C is loosely passed. A crank-arm u extends upward and backward from the lower end of the journal, and at the outer end this arm has a depending portion g^2 , provided with ears which give support to the upper and lower ends of a vertical rod h , fixed therein. The inner end of the carrying-finger C is formed with an eye and mounted loosely on the rod h , subject to the downward pressure of a spiral spring n , which is mounted on the upper end of said rod. The device as a whole turns around the journal g , which, being inclined in the same manner as the journals heretofore described, causes the fingers to swing downward and inward toward the rear, the action of the parts in this regard being precisely the same as if the finger C were rigidly fixed to the journal g . The receiving-finger C rests in the eye g' as a fulcrum. When the fingers are loaded at the outer ends, they overcome the resistance of the spring and fall to substantially a horizontal position. When, however, they are swung to the rear and the load discharged, the springs n act to lift their outer ends clear of the stubble, so that they may swing forward without resistance to their normal position. It will be observed that this vertical motion of the fingers under the influence of spring n is entirely distinct and apart from the motion by which it discharges the bundles and is solely for the purpose of lifting the ends clear of the ground, so that they may not be prevented from swinging forward. The manner of connecting and operating these parts in connection with this particular form of device is also shown in Fig. 1.

The crank-arms u of the devices shown in Figs. 6 and 7 may be connected and controlled by a rigid bar applied thereto and operated in the same manner as the bar D. (Shown in Fig. 10.)

In the finger-supporting joint represented in Fig. 8 an inclined journal g is provided at the lower end with an eye g' and at the upper end with a crank-arm u , and mounted in an inclined position in bearings on the board E in the same manner as in the preceding example. The carrying-finger C is passed loosely through the eye and rigidly attached to an arm g^3 , the upper end of which is connected by a horizontal pivot n^2 to the upper end of journal g . A curved arm g^4 , attached to the arm g^3 and passing through the crank-arm, is encircled by a spiral spring n , which acts, like the spring n of the preceding device, to lift the outer ends of the fingers C clear of the ground as soon as they are relieved from their load. The device as a whole swings rearward around the journal g as an axis, the fingers having a downward, rearward, and inward movement, or, in other words, a movement in an oblique path, to effect the delivery of the bundles. The crank-arms of these devices may be connected and con-

trolled in the same manner as the cranks in the other examples.

For the purpose of swinging the fingers forward from their dumping to their receiving positions I propose to provide each of the inclined journals, as shown in Figs. 6 and 7, with an encircling spring m , attached at one end to the journal and bearing at the other against the board E, its tendency being by resisting the rotation of the journal g to prevent the fingers from swinging rearward and to swing them forward after they have been forcibly carried to the rear. This returning-spring may be applied to the individual fingers in each of the several forms of my joint. If desired, the axis of each finger may be inclined not only in a direction transverse to the line of travel, as already explained, but also in the direction of the line of travel, or, in other words, in an upward and rearward direction, as shown in Fig. 7. This inclination in a fore-and-aft direction contributes, also, to the falling motion of the finger as it swings to the rear, and if sufficiently great it would alone permit the end of the finger to rise and fall the required distance.

In practice I use four movable fingers; but a greater or less number may be used if found desirable.

In some cases I find it desirable to so connect the series of fingers that in the event of one of them being obstructed in its movement the others may still be operated. This of course cannot be done when a rigid connecting-bar is applied to the cranks, as above described, and illustrated in Fig. 10. It may be accomplished, however, by the construction shown in Fig. 5. In this figure the connecting-bar D is pivoted to two sustaining arms or links H, which are in turn pivoted to the side-board E, so that as the bar is moved endwise it will move to and from the board and to and from the journals or axes of the fingers. The links H are made of a length greater than the throw of the cranks on the fingers, so that the edge may be carried past the cranks without touching them. At suitable points on its edge the bar is provided with rigid pins e , which encounter the crank-pins u as the bar is moved forward to cause the dumping action of the fingers. This arrangement permits the bar and the other fingers to return to their normal positions, although one of the fingers, meeting an obstruction, is held to the rear. In other words, it permits the individual fingers to swing rearward under the influence of a resistance at its outer end without affecting the others.

In order that the fingers may be locked in their receiving position after reaching the same without interfering with the independent action above named, the bar D may be provided with spring-catches v to engage against the respective cranks u on the forward side. As the bar D moves forward and the fingers swing rearward the links H carry the bar laterally until the catches v disengage

from the cranks, so that although one of the fingers may be held by an obstruction in its backward position, as shown on the right hand in Fig. 5, the bar and the remaining fingers may return to the normal position. (Shown at the left hand in the same figure.) When the finger which was detained swings again to its normal position, its crank will override and engage behind the catch, as before.

In order to prevent the fingers from being started rearward by the jolting of the machine or otherwise, a gravitating latch I is pivoted to the side-board E and provided with a shoulder P to engage one of the links H, as seen in Figs. 4 and 5. The forward end of this latch has an under beveled surface *o* in position to be acted upon by the bell-crank lever *a*. The connecting-chain *a*⁶ is left sufficiently slack to admit of the lever disengaging the latch before the movement of the bar D begins.

In practice I prefer to employ a single side-board only with one set of fingers. I may employ two side-boards—an inner one and an outer one—each with a series of fingers attached thereto, as shown in Fig. 12, in which E and E' represent two side-boards united at the forward end by a cross-piece E². The fingers C C are in two series, those of one series attached to the inner board and extending outward from the machine, while those of the other series are attached to the outer board E' and extended inward toward the machine. The free ends of the two series stand when in the receiving position in close proximity to each other. The fingers are mounted to swing downward and rearward and to permit the escape of the sheaves between them. The sustaining-axes may be constructed in either of the forms hereinbefore described. The fingers may be connected and provided with crank-arms connected by controlling-chains, as shown in the drawings, or by similar connections. In order to prevent the bundles from falling outside when but one side-board is used, the carrier is provided with a stationary guard F. This, as shown in Figs. 1 and 3, is simply a rigid bar extending from the side-board outward over the front of the carrier and thence rearward over its outer side about one-third or one-half of its length. The guard may be integral with the bracket or hanger *b*, which supports the side-board, as shown in Figs. 1 and 6.

It is not essential to the successful operation of my carrier that the descent of the fingers shall be uniform throughout their whole course, and the word "oblique" is used herein in a relative sense to indicate a gradual downward movement as the finger swings backward.

In the application of the novel principles herein set forth the invention is not limited to the particular devices shown and described, as I am aware that the peculiar backward and

downward movement of the fingers around individual axes may be effected in a great variety of ways and by many forms of equivalent devices invented by myself to this end, those shown having been selected as illustrating in a simple way the nature of the invention. The same may be said of the means for lifting the ends of the fingers and the discharge of their load, the means for locking the fingers, and the means for independently actuating them.

By the phrases "inclined from the vertical," "inclined journals," "inclined as described," and similar phrases herein employed is meant such inclination from the vertical as will cause the tooth to swing downward, rearward, and sideward.

Having thus described my invention, what I claim is—

1. A sheaf-carrier consisting of fingers that form a platform upon which sheaves are discharged, each finger being secured to a support by means of a joint having an axis obliquely inclined relative to the length of the body or supporting portion of the finger to cause it to move downwardly, backwardly, and sidewardly toward its support, and means for preventing the movement of the sheaves sideward off from the said supporting-fingers.
2. A sheaf-carrier consisting of fingers and a support for each finger adapted to form a bottom to support sheaves and sides to prevent their escape in lateral directions, said fingers being connected to the framework by means of joints having inclined axes, whereby they are adapted to move downwardly, rearwardly, and sidewardly toward their supports to draw from beneath the load.
3. A sheaf-carrier having side limits that prevent the bundles from escaping, fingers adapted to lie beneath the sheaves and sustain the load, said fingers secured to the framework of the machine by means of joints having axes inclined, whereby the weight of said sheaves is instrumental in turning the fingers downward and sideward to permit the discharge of the load.
4. A sheaf-carrier for self-binding harvesters, consisting of a receptacle having a bottom for sustaining the weight of the sheaves and sides to prevent the escape of the sheaves in lateral directions, said bottom consisting of fingers connected to the framework of the machine by joints having inclined axes, whereby they are permitted to swing rearwardly, downwardly, and sidewardly to draw from beneath the load.
5. In a sheaf-carrier for harvesters, a series of laterally-extending carrier-fingers, each mounted at one end of an axis inclined from the vertical in position to allow them to swing rearward and downward in an oblique path sideward toward their support, and a guard or side limit to retain the sheaves on the carrier-fingers until discharged.
6. In a sheaf-carrier, the combination of a

bar E, lying in a fore-and-aft direction, a series of sheaf-receiving fingers, each having a journal or pivot mounted on the bar at an inclination from the vertical in position to allow the finger to swing rearward and downward sideward toward its support and each having a crank-arm, a connection between said crank-arms, and an operating device extending thence to a point adjacent to the driver's seat, and a guard or side limit to retain the sheaves on the carrier-fingers until discharged.

7. In a sheaf-carrier, the combination of a sustaining-bar, a series of sheaf-receiving fingers extending normally in a lateral direction therefrom and each sustained at the inner end by an axis obliquely inclined relative to the length of the body or supporting portion of the finger, around which it may swing rearwardly, backwardly, and sidewardly toward its support, a bar connecting said fingers to compel their movement in unison, operating devices extending from the bar to a point adjacent to the driver's seat, and a latch or lock to hold such bar, and thus the fingers, in the receiving position, and a guard or side limit to retain the sheaves on the carrier-fingers until discharged, substantially as described.

8. The combination, with a grain harvester and binder, of a supporting board or bar extending in a fore-and-aft direction, a series of outreaching sheaf-carrying fingers, each having at the inner end a supporting journal or axis inclined, as shown and described, in relation to the body of the finger and to the vertical in a plane at right angles to the line in which the machine advances, whereby the fingers are permitted to swing rearward, downward, and inward toward their support and toward each other, and a guard or side limit

to retain the sheaves on the carrier-fingers until discharged.

9. In a sheaf-carrier, a fore-and-aft board or bar E, in combination with a series of laterally-projecting sheaf-receiving fingers, each having at its inner end a sustaining-journal inclined, as described and shown, in relation to the body of the finger and also inclined in the direction of the length of the board.

10. In a sheaf-carrier, and in combination with a sustaining-bar, a series of laterally-extending sheaf-receiving fingers, inclined journals or axes by which said fingers are sustained and around which they swing with a rearward, downward, and sideward movement toward their support, a bar connecting said fingers to compel their movement in unison, and a spring tending to hold the fingers in their normal or receiving position, and a guard or side limit to retain the sheaves on the carrier-fingers until discharged.

11. In combination with a sheaf-carrier composed of fingers individually pivoted to swing rearward, the stationary guard F, extending over the end and along the outer side of the carrier to prevent the accidental escape of the sheaves therefrom.

12. In a sheaf-carrier, a series of sheaf-receiving fingers pivoted upon approximately vertical axes to swing rearwardly and each provided with a crank, in combination with an operating-bar D, provided with latches *v* and pins *e* to operate the respective cranks.

In testimony whereof I affix my signature in presence of two witnesses.

LUCIEN W. ELLIS.

Witnesses:

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E. R. WATTERS.