

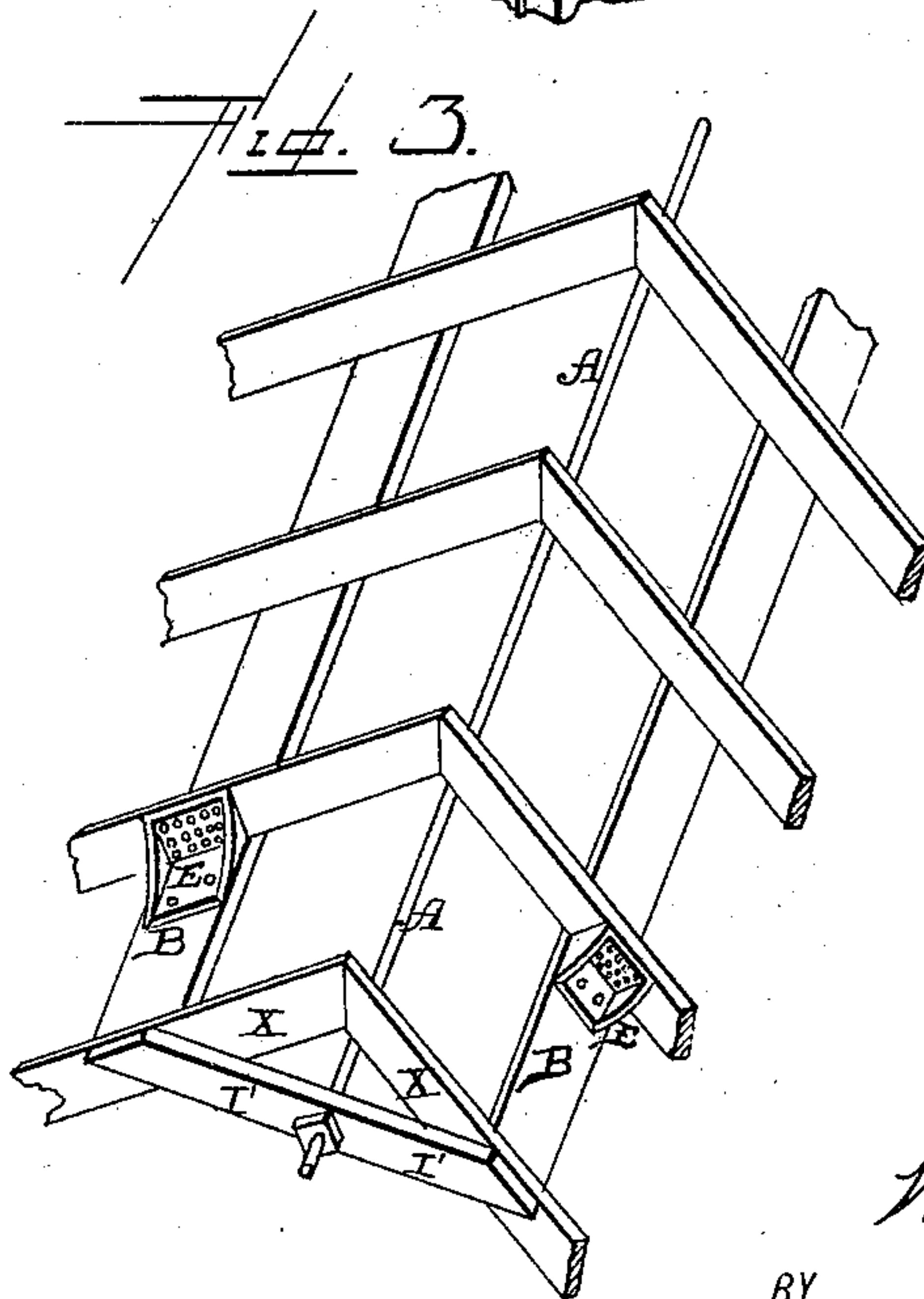
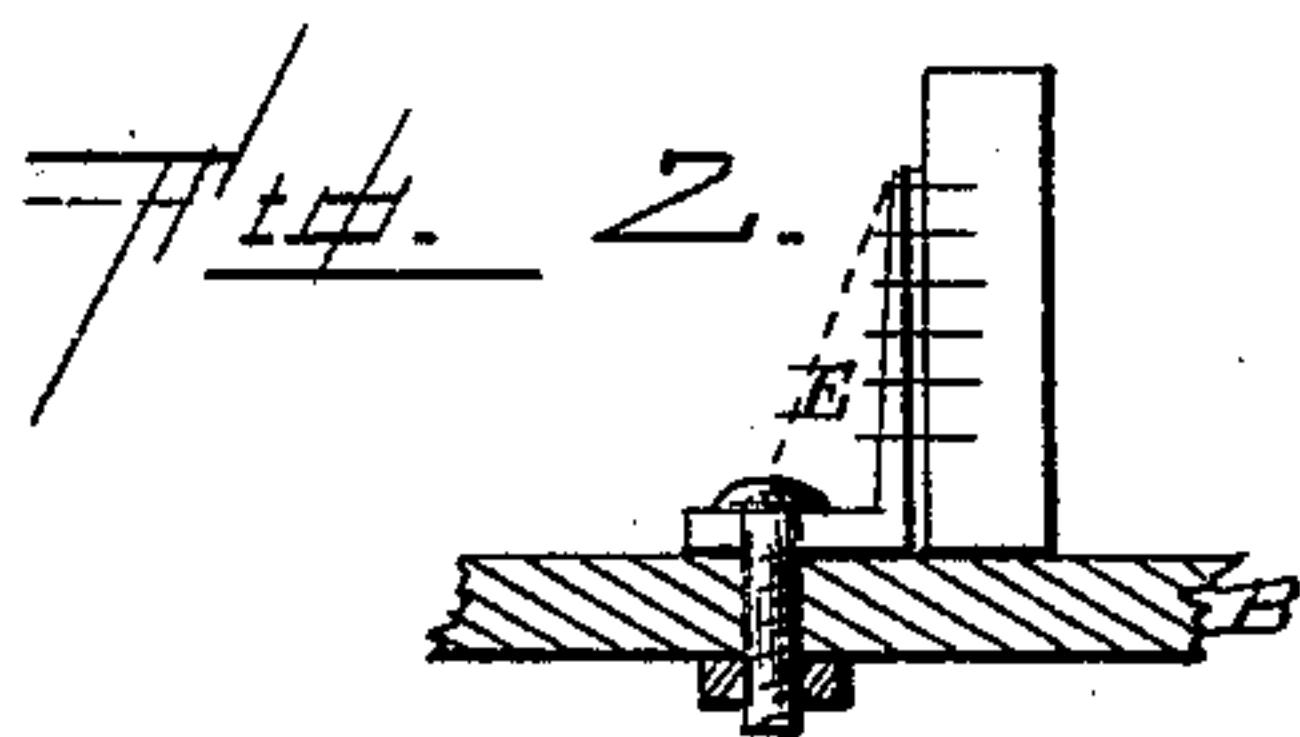
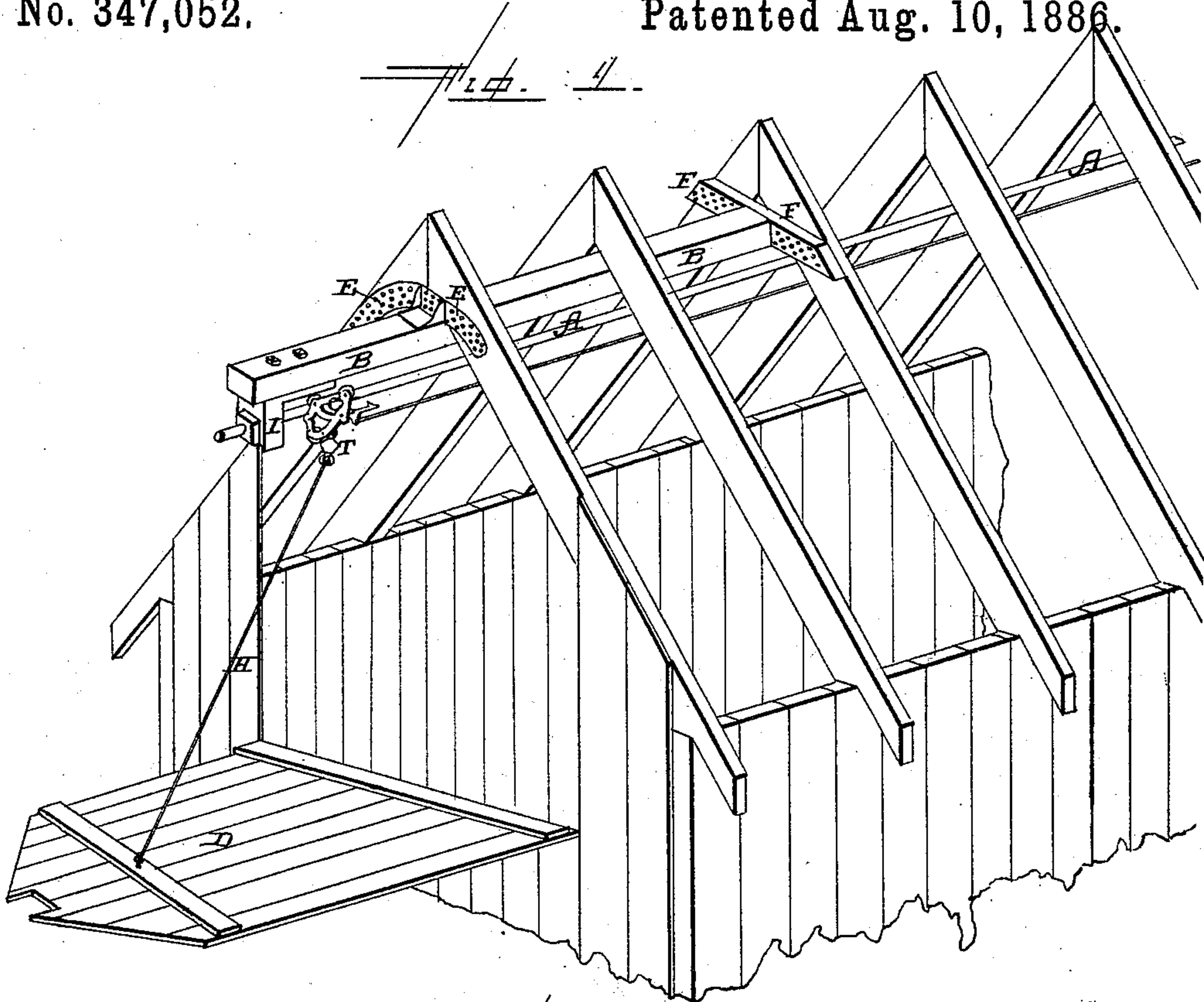
(No Model.)

3 Sheets—Sheet 1.

W. LOUDEN.
HAY ELEVATOR.

No. 347,052.

Patented Aug. 10, 1886.



WITNESSES:

K. F. Gardner
E. L. Burkett

INVENTOR.

Wm. Louden,

BY

J. A. Lehmann,
ATTORNEY.

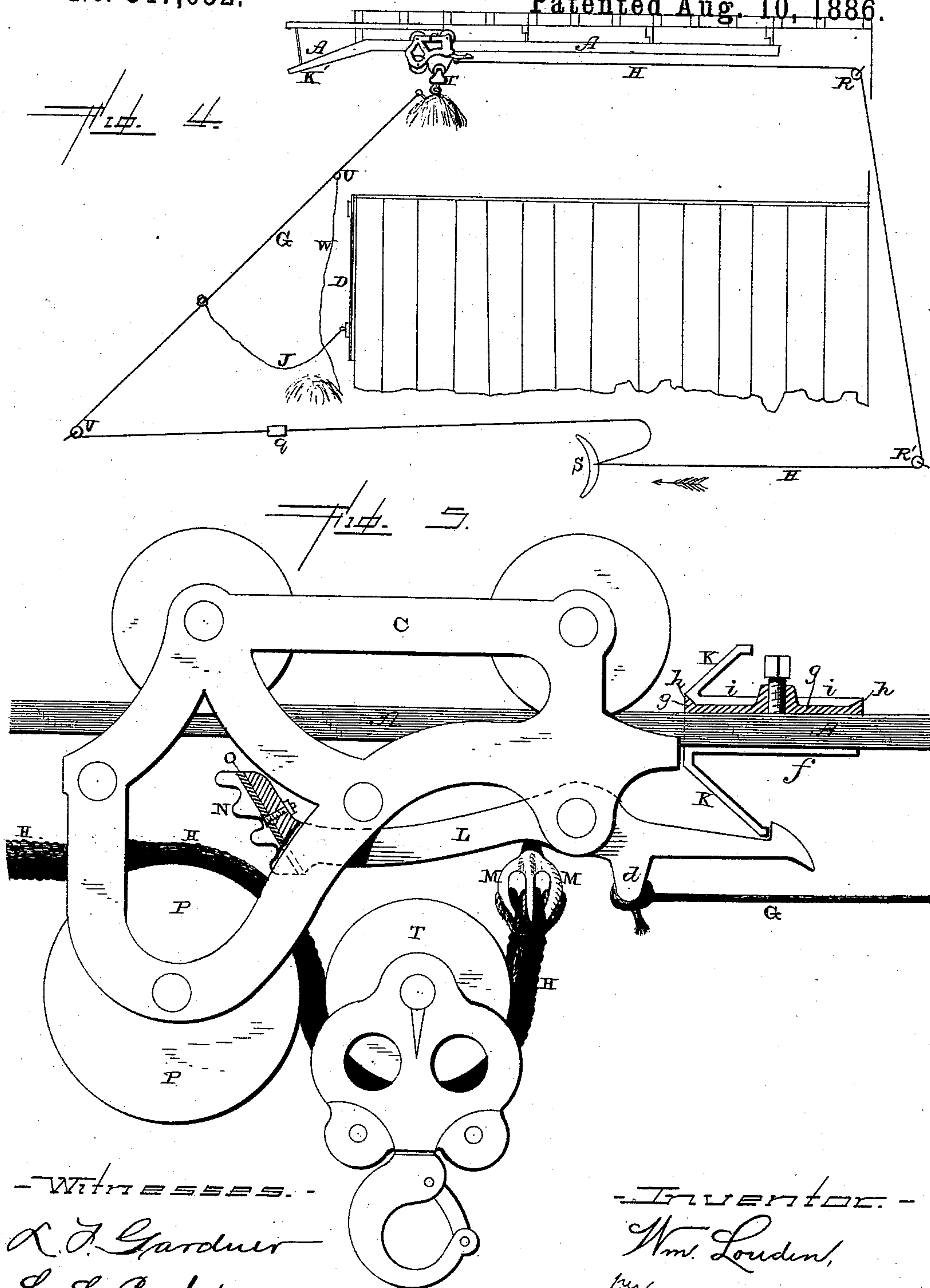
(No Model.)

3 Sheets—Sheet 2.

W. LOUDEN.
HAY ELEVATOR.

No. 347,052.

Patented Aug. 10, 1886.



-WITNESSES.-

X. J. Gardner
L. L. Purket,

Inventor.

Wm. Loudon,
per
J. A. Lehmann,
Atty.

(No Model.)

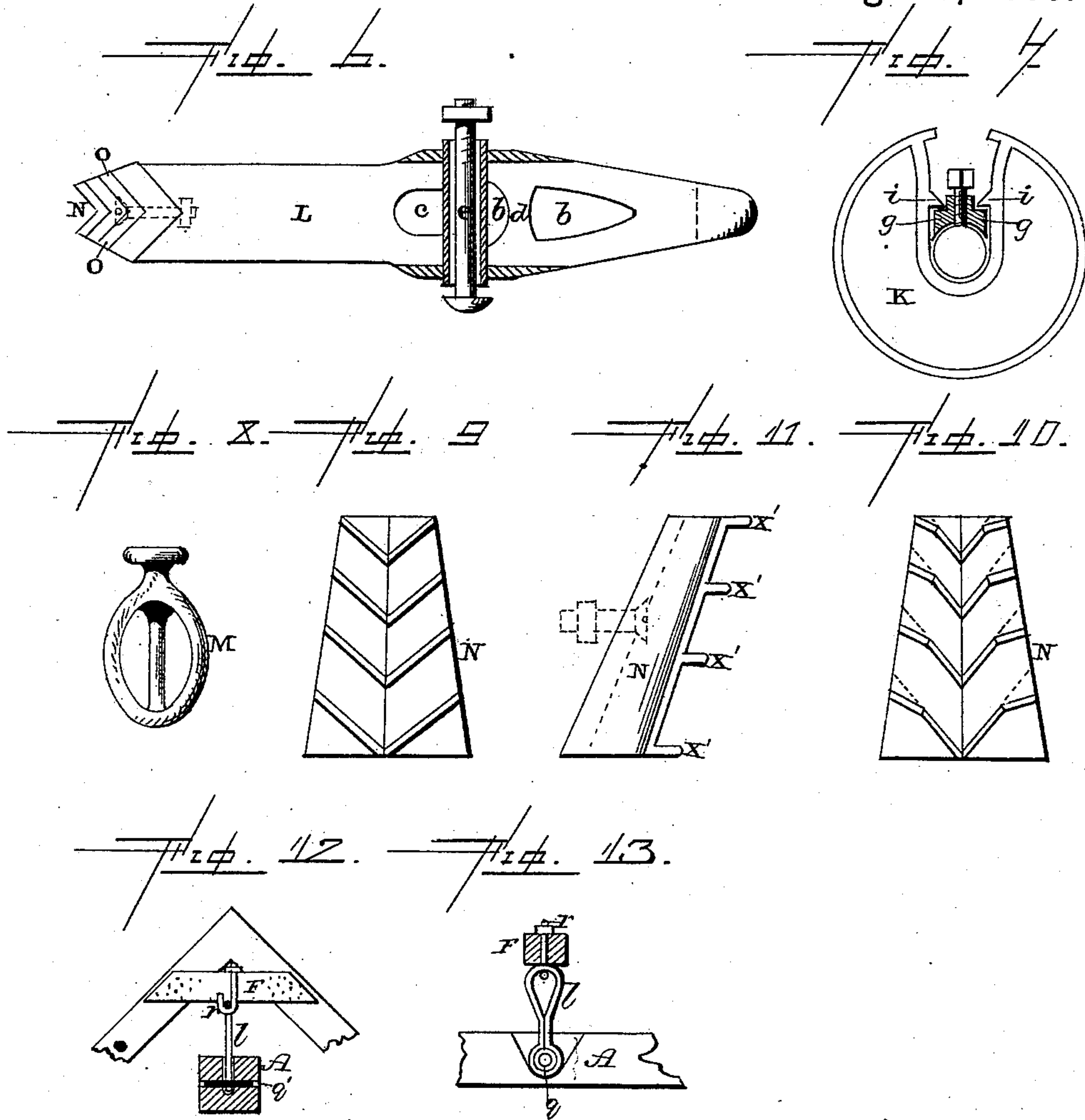
3 Sheets—Sheet 3.

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R. J. Gardner
L. L. Burkett

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Wm. Loudon,
per J. A. Lehmann,
att'y.

UNITED STATES PATENT OFFICE.

WILLIAM LOUDEN, OF FAIRFIELD, IOWA.

HAY-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 347,052, dated August 10, 1886.

Application filed January 19, 1886. Serial No. 189,064. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM LOUDEN, of Fairfield, in the county of Jefferson and State of Iowa, have invented certain new and useful Improvements in Hay-Elevators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in hay-carriers, and is intended as an improvement upon the patent granted to me December 18, 1883, and numbered 290,591; and it consists in, first, the means of forming extension-supports to support the extended end of the track in elevating the hay from the outside, and carrying it in through the end of the barn, so as to be readily attached to the rafters of any ordinary barn without special fitting therefor, and to form braces, when necessary, to prevent the rafters from being torn loose by the strain of the track; second, the combination of a door, to close the opening in the gable end of the barn, with the carrier and its hoisting-tackle, the door being hinged to the barn at its lower end and provided with an extended connection, by means of which it is connected to the carrier or its hoisting-tackle, so that the door can be lowered or raised or opened and shut by the movement of the hoisting-tackle and the operation of the carrier on the track; third, the combination, with the track and the carriage for moving thereon, of a hoisting-rope and a check-rope, which is attached to the unlatching or trip mechanism of the fork, hay-sling, ensilage-bucket, or any other instrument that may be used to hold the material being elevated, both ropes being attached to the draft-animal or other motive power, so that the movement of the power in opposite directions will elevate the load, draw it along the track, operate the trip mechanism of the holding device to discharge the load, draw the carriage back to the starting-point, and draw the fork or other holding device down to the operator below, thus making the entire apparatus more completely automatic in all its operations than any heretofore constructed; fourth, the combination of parts, which will be fully described hereinafter.

Figure 1 is a perspective view of a barn or other building with all of the roof but the rafters removed. Fig. 2 is a detail view of the same. Fig. 3 is a perspective showing one form of the extended support for the track. Fig. 4 is a vertical section of a barn, showing the track hung in the ridge of the roof and the arrangement of the ropes with the carrier. Fig. 5 is an enlarged sectional view of the carrier as constructed for an ordinary rod track. Fig. 6 is a top sectional view of the lock-lever. Fig. 7 is a cross-section of the catch-collar. Fig. 8 is a perspective of the triple swivel-eye, which turns in the lock-lever. Figs. 9, 10, and 11 are vertical and cross-section views of the brake-iron which fits in the end of the lock-lever. Figs. 12 and 13 are vertical and cross-section views showing the hangers for supporting the track to the rafters.

A is the track, which is hung in the ridge of the roof, and may be made of wood or iron, and in any desired shape.

The carrier C is provided with a suitable frame to hold the operating parts, and which may be adapted to run upon any kind of track. In its general features this carrier is the same as that patented to me December 18, 1883, No. 290,591; but in the present case the details of its construction and its arrangement with its operating-tackle are generally improved. The swivel-eye M, to which the end of the hoisting-rope is secured, is made with tripartite divisions, so that each strand of the rope can be passed through a separate division of the eye, as shown in Fig. 5. By this means the rope will always be held in line with the swivel, so that it will turn freely and without kinking, which cannot always be done with an ordinary swivel-eye.

The lock-lever L is made with an opening, b, in its body, where it is pivoted to the carrier-frame, and across this opening, and in front of the pivot-bolt e, the depressed connecting part d crosses from one side of the lever to the other, so as to form a loop, into which the check-rope G can be conveniently secured when it is desired to connect the check-rope directly to the carrier. The opening e in the rear of the pivot bolt or pin e is made smaller than that in front, so as to fit the neck of the swivel-eye M, while the opening in front is large enough to admit the head of the swivel.

To place the swivel in its place, remove the bolt or pin *c*, upon which the lever *L* is pivoted, pass the head of the swivel through the large opening *b*, and then pass the neck of the swivel into the smaller opening, *c*, and replace the bolt or pin *c*. The swivel will now be securely held in its place, while it will turn freely to let kinks out of the rope. By this construction the swivel may be easily removed or put in its place, and is more cheaply made than if put in in the ordinary way. The brake end of the lever *L* is made forked, as shown in Fig. 6, and the brake-iron is cast separately and fitted into the forked end of the lever, and is held in position by a suitable bolt or screw. By making the brake-iron separate from the lever it can be cheaply replaced, should it become worn, and it can also be adjusted out or in to compensate for the wear or for the variations in the size of the hoisting-rope *H* or the rope-sheave *P*, over which the hoisting-rope passes.

By placing one or more pieces of bushing, *O*, of leather, or other suitable material, between the brake *N* and the forked end of the lever *L* the brake can be adjusted to any desired length. The brake is made wider at the heel than at the point, and is provided with graduated serrations, as in my former patent, No. 290,591, and their serrations are made with varying angles, to better fit different sizes of ropes, the more obtuse angles being at the heel, and the more acute angles being at the point of the brake, as shown in Fig. 9.

In order to secure as close an adjustment as possible of the brake to the hoisting-rope, the corners of the serration may be taken off, as shown in Fig. 10, so that as the hoisting-rope oscillates from side to side in passing over the rope-sheave *P* it will not strike against the corners of the serrations or ribs in the V-shaped brake. As formerly made, these serrations in the V-shaped brake were themselves made V-shaped, thus presenting sharp edges and oblique sides to bite on the rope, causing wear of the rope, and not holding it very securely. To overcome this difficulty I here set the serrations or holding-webs *X'* obliquely on the face of the brake, make their sides approximately parallel to each other, and make the edges rounding, as shown in Fig. 11, which is a side elevation of the brake-iron *N*. By this means the rope is not worn, because the edges are round and smooth, and the rope being pressed in between the serrations or holding-webs *X'* will be securely held by contact against the hooking sides of the serrations. By this means a firm grip upon the rope is secured and the wear upon it is reduced to a minimum.

The improvements in the brake herein set forth can all be used together in the same brake, or only parts of them, as desired. That shown in Fig. 10, whereby the serrations have more acute angles in the middle than at the edges, is especially applicable to the serrations or webs at the heel of the brake and

nearest to the rope, while it may be omitted in the others, if desired. The brake-iron being cast separately from the lever *L* makes it easier to set the serrations obliquely and with parallel edges, as shown in Fig. 11, although this may be done if the brake-lever were cast in one solid piece.

The catch-collar *K*, which holds the carrier stationary on the track, is made concave, as shown, and has a semicircular web or flange, *f*, extending out from the concave side, and an opening through one edge to admit the track *A* into this extended flange. By this means the collar can be made very light and at a small cost, and the track by being clamped against this extended flange will hold the collar securely to its place.

Any suitable means can be used to clamp the flange *f* to the track *A*, but a preferable way is shown in the drawings. The flange *f* is provided with small ribs *i*, under which a key or wedge, *g*, having a set-screw, is placed. By turning up the set-screw against the track *A* the key *g* will be pressed tight against the ribs *i*, and the flange *f* will be securely clamped against the track. To prevent the key *g* from slipping out, small projections or shoulders *h* are formed on each end of the key and engage the ends of the ribs *i*, as shown in Fig. 5, room enough being left under the ribs *i* to slip the key under before the set-screw is turned up.

In Fig. 1 is shown an ordinary iron-rod track, *A*, extended out at the end of the barn to elevate the hay from the outside. In order to support the outer end of the track, I provide the extension-bar *B*, to one end of which is secured the collar-beam *F*, and to the other end a suitable bracket or hanger, *I*, to receive the rod. To the outside or end pair of rafters I secure an angular iron, *E*, by bolts, nails, or other suitable fastenings, the iron *E* being adapted to fit the rafters, and being perforated so that the fastenings may be driven through it at any desired place. Through the horizontal part of the iron *E* one or more bolts are passed, as shown in Fig. 2. A hole or holes are bored through the bar *B* at the proper places to receive this bolt or bolts, which are then screwed up tightly, and the collar-beam *F*, attached to the inner end of the bar *B*, is suitably secured to a pair of rafters in the interior of the building. When it is necessary to thoroughly stay the rafters, the bar *B* can be extended back into the barn as far as desired, and the intervening rafters between the iron *E* and the collar-beam *F* can all be secured to the bar *B* in any suitable manner, so as to thoroughly brace the rafters together, and prevent any of them from being torn out by the strain of the rod.

A preferable way of arranging an extended support for a long iron-rod track, or where there is a great strain, is shown in Fig. 3. In this case two extension-bars *B* are secured to the under side of the rafters, (one on each side of the ridge of the roof,) and two perforated

angular irons, E, are used to secure them to the outside rafters. In place of the bracket or hanger I, used with one extension-bar, a cross-bar, I', is secured to the ends of the bars B, and a hole is bored through the center of this cross-bar to receive the rod. Small false rafters may be secured to the ends of the cross-bar I', and to the upper sides of the extension-bars B, and upon these rafters a light covering or roof can be placed. Besides the advantage of a roof to cover the projecting end of the track, these false rafters will help to hold the cross-bar I' in its place on the ends of the extension-bars B. The bars B can be extended into the interior of the barn indefinitely, and be secured to every rafter, if desired. They may even be extended clear through the building and out at the opposite end, to support the opposite end of the track, in the manner already described. When a wooden track is used, as in Fig. 4, the bracket or hanger I in Fig. 1 can be dispensed with, and any suitable kind of track-hangers be attached to the bar B. When not needed to brace the rafters, the iron E and collar-beam F can be secured to either side of the rafters most convenient to the workman, and when the bar B is otherwise secured to the interior rafters the collar-beam F may be dispensed with. The iron E may have one or more bracing-webs to strengthen it, as shown in Figs. 1 and 3, and by dotted lines in Fig. 2.

By the means herein described a very substantial, cheap, and easily-erected extension-support is produced, and one which will support any kind of an elevated track.

To close up the opening in the gable end of the barn through which the hay is taken, when not in use, I hinge a door, D, at its lower end to the barn, as shown in Fig. 1. In order to overcome the difficulty of opening and shutting doors hung in this way, I attach one end of a short rope, J, to the door near its upper end, or at any suitable place for raising and lowering it, but preferably to the upper batten and about one-fourth way from the upper end. To close the door when open, and when the carrier and its attachment are in working order, I detach the fork or sling from the trip-pulley T of the carrier, and connect the other end of the rope J to the trip-pulley in place of the fork or sling. The horse is then started, and the door is raised about half-way up, as shown in Fig. 1, when the carrier is unlatched by the contact of the trip-pulley, and runs on the track into the barn and draws the door after until it is closed. To open the door, all that is necessary is to start it out, so that its gravity will draw the carrier out on the track and latch it, when the door will descend to its open position, (shown in Fig. 4,) drawing the hoisting-tackle after it, where the tackle will be in easy reach of the operator below.

In place of the rope J, a piece of chain or any other suitable connecting device can be used, the object being to have an extended connection between the door and the carrier,

so as to allow sufficient elbow-room for the latching and unlatching of the carrier. The door being hinged at its lower end, it cannot be elevated like ordinary articles in a straight or perpendicular line to the carrier, but must be elevated in a curved line, varying from a perpendicular to a horizontal. If the trip-pulley were attached directly to the door, as in ordinary operation, it would reach the pulley in such an oblique position that it would fail to perform its functions. By means of my extended connection between the door and the carrier this difficulty is overcome, and a convenient opening and closing device is produced, whereby large and heavy doors high up in the gable ends of large barns can be readily opened and shut. When no trip-pulley is used with the carrier, the extended connection can be made with the hoisting-tackle of the carrier in any suitable manner, so that there will be sufficient space between the door and the tripping device that the horizontal draft of the door in opening and closing will not interfere with the proper working of the latching and unlatching devices, as before stated.

In Fig. 4 the door D is shown as hanging down by the side of the barn, and the carrier and its attachment are fitted up ready for the operation of elevating and carrying the hay into the barn. In this figure the projecting end of the track is bent abruptly downward, the object of which will be hereinafter stated. The hoisting-rope H, after leaving the carrier, passes through the guiding-pulleys R' R', and to the hoisting single-tree S. The check or return rope G is attached to the tripping lever or mechanism of the fork or other instrument used for holding the load to be elevated. It is then passed through the guiding-pulley V, and conducted to and connected with the single-tree S, or by other means connected to the motive power. An adjustable stop, Q, may be placed on the check-rope G, as shown in Fig. 4. It will be seen that the movement of the horse in the direction of the arrow will elevate the load and draw it into the barn on the line of the track until the stop Q on the check-rope G comes in contact with the pulley V, when the further draft of the horse will cause the check-rope G to trip the holding device and discharge the load. Then the return movement of the horse will draw the carrier back on the track to the starting-place and latch it, and then draw the fork or holding device down to the operator below. When the track is horizontal, or only slightly inclined at the projecting end, as in Figs. 1 and 3, the pulley V should be located so that the check-rope G will run on an incline of about forty-five degrees from the end of the track, so as to draw the carrier back easily; but in places where there is not sufficient room for this, as well as to prevent the fork from being drawn too far from the end of a high barn and away from the operator by the distant location required of the pulley V, I make an abrupt decline, K', in the projecting end of the track A. When this

is done the pulley V can be located much closer to the end of the barn, and the fork will be drawn down approximately perpendicularly to the end of the track and closer to the operator than when the track is horizontal or only slightly inclined; but when the track has to be made horizontal, to suit the structure of the barn, or for other reasons, or when the barn is very high, the fork will necessarily be drawn too far away from the operator, even if the projecting end of the track is to some extent abruptly inclined. To overcome these difficulties and to make my invention practical under all circumstances, I place a small pulley or ring, U, on the check-rope G between the pulley V and the carrier, and to this pulley or ring U, I connect a small cord, W, which can be secured within easy reach of the operator below. The check-rope G will pass freely through the small pulley or ring U, and the fork can always be drawn to the operator, as well as the check-rope G, should he wish to handle it to discharge the load, instead of using the stop Q, or for any other purpose.

In Fig. 4 the connecting-rope J of the door is shown utilized as a connection of the cord W while it is not otherwise in use. Of course, this cannot always be done, as this connection will sometimes be in the way of the load to be elevated, in which case the cord W can be otherwise connected, so as to be within easy reach of the operator. Substantially the same arrangement of the hoisting-rope H and the check-rope G can be used when the hay is elevated in the center of the barn.

If the driveway in the center of the barn is wide enough in proportion to the height of the track, or there are no obstructions in the way the track may be made horizontal throughout. If not, the difficulty may be overcome by abruptly inclining the part of the track over the driveway, so as to give the check-rope G the proper draw on the carrier to bring it back to the latching-place, which in this case will be at the center of the inclined part of the track. If desired, the stop Q on the check-rope may be dispensed with, and the return draft of the horse be depended upon to operate the tripping mechanism of the holding device and to discharge the load; also, additional guiding-pulleys may be used to conduct the ropes around intervening obstacles without departing from the spirit of my invention.

Very frequently in constructing an elevated track for hay-carriers it is necessary to support it at intermediate points, and especially is this the case when the track is constructed of wood, as in Fig. 4. When such supports are necessary, I secure additional collar-beams F to the proper rafters, as shown in Fig. 12. I bore a hole through the middle of each collar-beam and pass a hooked bolt, r, up through the hole, so that the burr will be on top and the hooked end below. I also bore two countersunk holes in the lower edge of the collar-

beam, one on each side of the main hole, so that the hook can be turned to either side and have a countersink opposite to secure the point of the hook. I then make flaring mortises in the center of the track, as shown in Fig. 13, to correspond with the collar-beams on the rafters, and insert in each mortise a link, l, and drive a pin, q', through the track crosswise to hold the link from coming out. I then hook the link over the hooked end of the bolt r in the collar-beam and screw the burr up tight, drawing the point of the hook well in the countersink opposite. By this means a very secure and convenient support is produced, which will hold the track positively to its place and prevent it from springing either upward or downward, while at the same time the track will be perfectly flexible, and free to move sidewise or endwise, provided it is not rigidly attached at the ends, so as to relieve the rafters of the greater part of the strain incident to the operation of the carrier. When a wooden track is used, the hooked bolt r, link l, and pin q' can be used to attach the track to the extension-bar B, in which case the hooked bolt r will be secured directly to the bar B. When the track is thin, and the mortise goes clear through it, the link l, being closed or made solid at the middle, so as to form a hole at its lower end for the pin q' to pass through, will still hold the track from springing up and causing the unloaded carrier, as it passes along the track, from catching against the collar-beams or rafters, as is frequently the case with other track-hangers, thereby permitting the track to be hung much closer up in the peak of the barn than if the ordinary hang-hooks were used. If desired, the upper part of the link l can be formed into a hook, and be secured to the building in any suitable manner.

The novel features and combinations herein shown and described in connection with each other, while preferably intended to be used with each other to form one complete hay-elevating device, that can be adapted to the varied situations in which said devices have to be used, can also be used separately and independently of each other, without limiting the scope of the individual parts of which my hay elevator and carrier is composed. For instance, the triple swivel-eye M can be connected to the carrier in any suitable manner without affecting the value of the triple eye itself, and, vice versa, any kind of a swivel-eye can be attached to the lever L in the manner shown without affecting the value of that method of attaching the swivel-eye. It is the same with other parts not claimed in combination with each other.

Having thus described my invention, I claim—

1. In hay elevators and carriers, a swivel-eye having tripartite divisions, in combination with a three-strand hoisting-rope, substantially as shown and described.

2. The combination of the pivoted lever

L, having an opening in its body, and a depressed connecting part, *d*, with the swivel-eye, the carriage, the track, the ropes G H, and the pulleys P T, substantially as described.

5 3. A pivoted lever, L, having a large opening on one side of the pivot and a small opening on the other side, in combination with a suitable swivel-eye, rope H, carriage, the pulleys, and track, substantially as set forth.

10 4. The combination of the brake-lever L, the brake-iron N, adapted to fit in the end of the lever, and the bushing O, the rope H, the pulleys, and the carriage, substantially for the purpose set forth.

15 5. A brake-lever, L, having the V-shaped serrated brake N, in combination with the hoisting-rope H and rope-sheave P, the angles of the serrations being more acute at the point than at the heel of the brake, substantially as shown.

20 6. A brake-lever, L, having a V-shaped serrated brake, in combination with the hoisting-rope H and rope-sheave P, the serration being set obliquely on the face of the brake, and having approximately parallel sides and rounded edges, substantially as shown.

25 7. A catch-collar, K, made concave on one side, with an opening in one edge, and with an extended web or flange, *f*, in combination with a clamping device to clamp the web or flange *f* to the track, substantially as described.

30 8. The catch-collar K, having an extended web or flange, *f*, and an opening in one edge, in combination with the wedge or key having a set-screw and the ribs *i i*, substantially as set forth.

35 9. The combination of an elevated track, a carriage for moving thereon, a hoisting-tackle to operate the carriage, and a door, D, the door D being hinged at its lower end to the barn, and being connected to the carriage on the hoisting-tackle by means of an extended connection, substantially as shown and described.

40 10. The combination of an elevated track, a carriage for moving thereon, a hoisting-rope, H, trip-pulleys T, door D, hinged at its lower end, and the connecting-rope J, substantially as and for the purpose set forth.

50 11. The combination of an elevated track or

railway, a carriage for moving thereon, a hoisting-rope for elevating the load and drawing the carriage along the track, suitable guiding-pulleys for conducting the ropes, and a check or return rope attached at one end to the tripping mechanism of the holding device and at the other end to the operating-power, so that the application of the power in opposite directions will elevate the load, draw the carriage along the track, operate the tripping mechanism to discharge the load, return the carriage to the starting-point, and latch it to the track, and then draw the fork or holding device to the operator below, substantially as set forth.

65 12. The combination of the track, the carriage for moving thereon, the hoisting-rope, suitable guiding-pulleys, the check-rope attached to the tripping mechanism of the fork or holding device, both ropes being connected to the operating-power, and the stop Q, placed upon the check-rope, for the purpose set forth.

70 13. The combination of the elevated track having the abrupt incline A', the carriage for moving thereon, the hoisting-rope, suitable guiding-pulleys, and the check or return rope G, which is attached at one end to the fork or holding device and at the other end to the operating-power, so as to return the carrier to the starting-point and draw the fork or holding device down approximately perpendicular to the inclined part of the track, substantially as described.

75 14. The combination of the check-rope G, attached at one end to the hoisting-tackle of the carrier and at the other to the operating-power, with the cord W, to draw the check-rope within reach of the operator, substantially as specified.

80 15. The combination of the carrier C, check-rope G, guiding-pulley V, cord W, and the pulley or ring U, adapted to run on the check-rope G, substantially as set forth.

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

WILLIAM LOUDEN.

Witnesses:

GEO. C. FRY,
WM. M. READ.