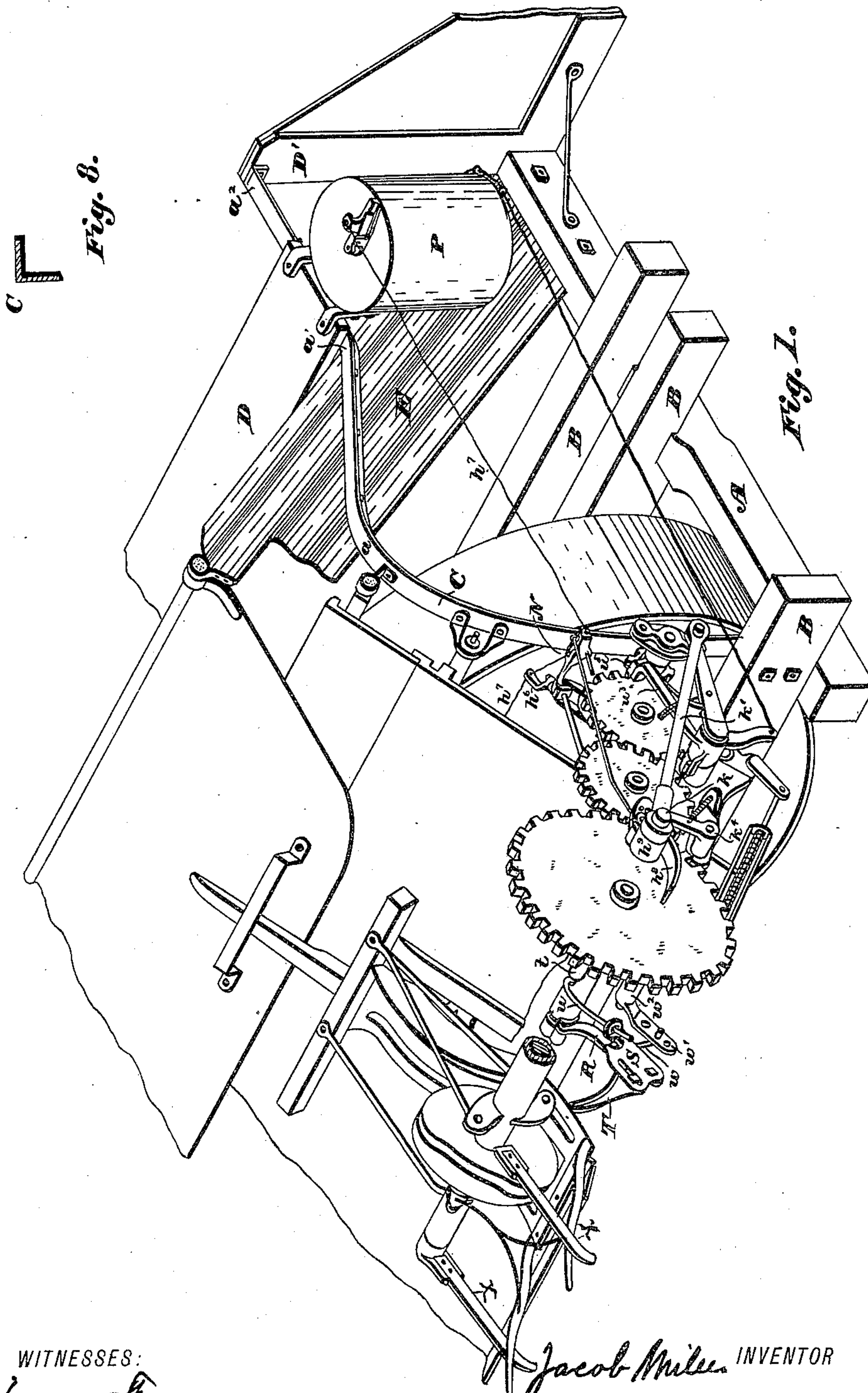


(No Model.)

J. MILLER, Dec'd. 5 Sheets—Sheet 1.
L. and R. A. MILLER, Administrators.
HARVESTING AND BINDING MACHINE.

No. 429,045.

Patented May 27, 1890.



WITNESSES:

Harry Grease
Chas. R. Miller

Jacob Miller INVENTOR

BY
W. R. Miller
ATTORNEY

(No Model.)

J. MILLER, Dec'd.

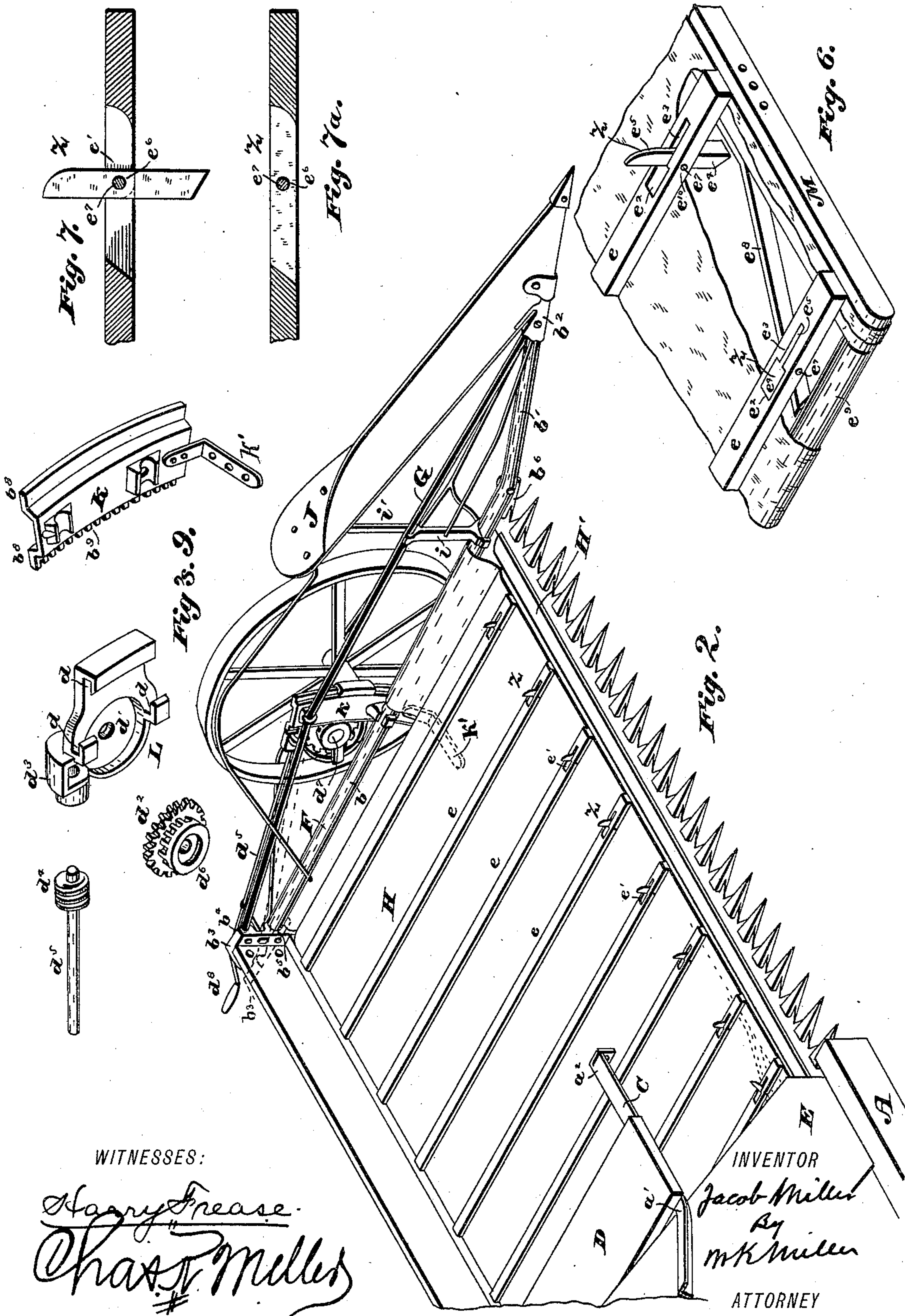
5 Sheets—Sheet 2.

L. and R. A. MILLER, Administrators.

HARVESTING AND BINDING MACHINE.

No. 429,045.

Patented May 27, 1890.



WITNESSES:

Harry Grease.
Chas. T. Miller

INVENTOR

Jacob Miller
By
mK Miller

ATTORNEY

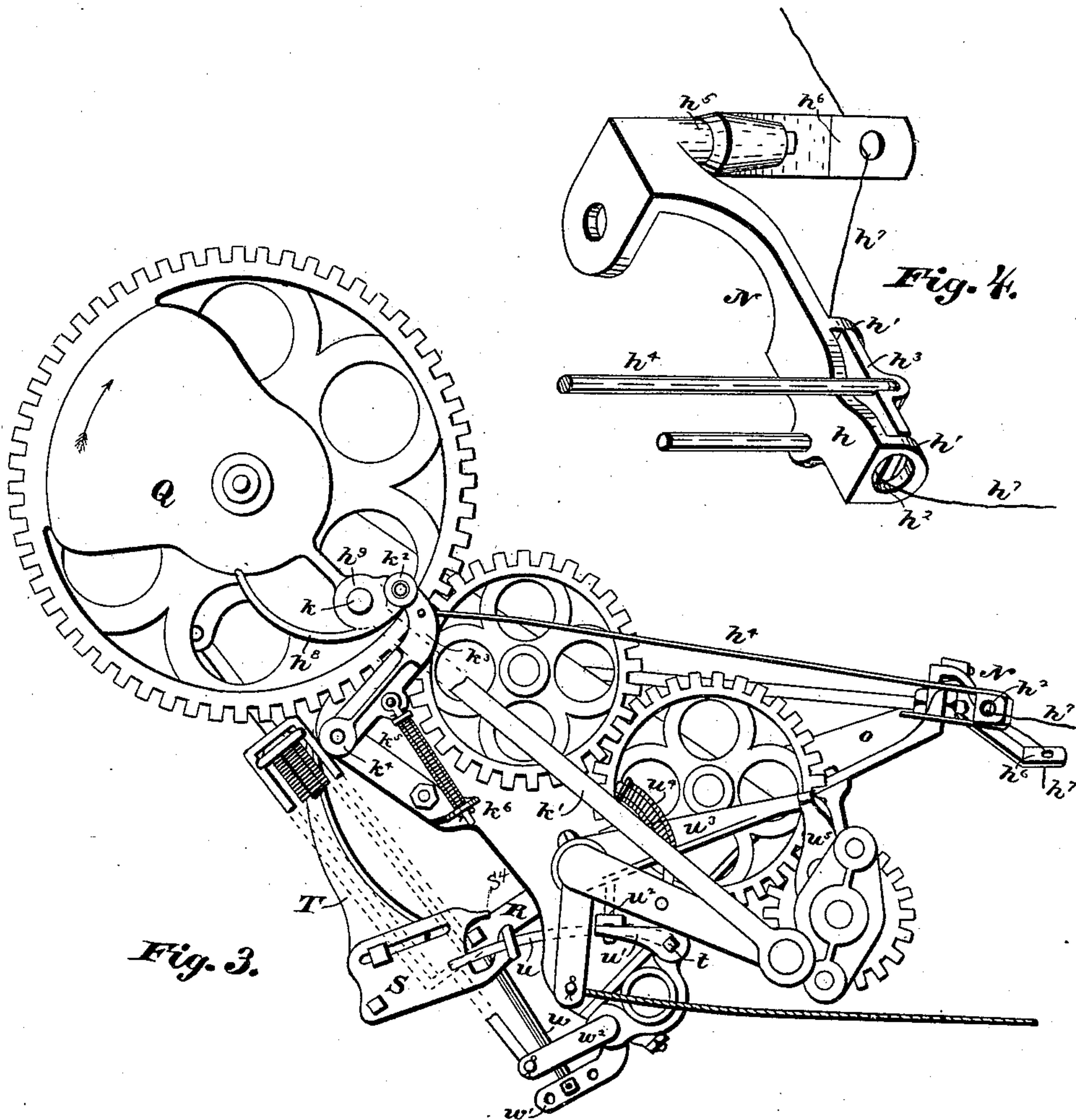
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J. MILLER, Dec'd. 5 S
L. and R. A. MILLER, Administrators.
HARVESTING AND BINDING MACHINE.

No. 429,045.

Patented May 27, 1890.



WITNESSES:

Harry Grease.
Chas. R. Miller

Jacob Miller INVENTOR

BY

W K Miller ATTORNEY

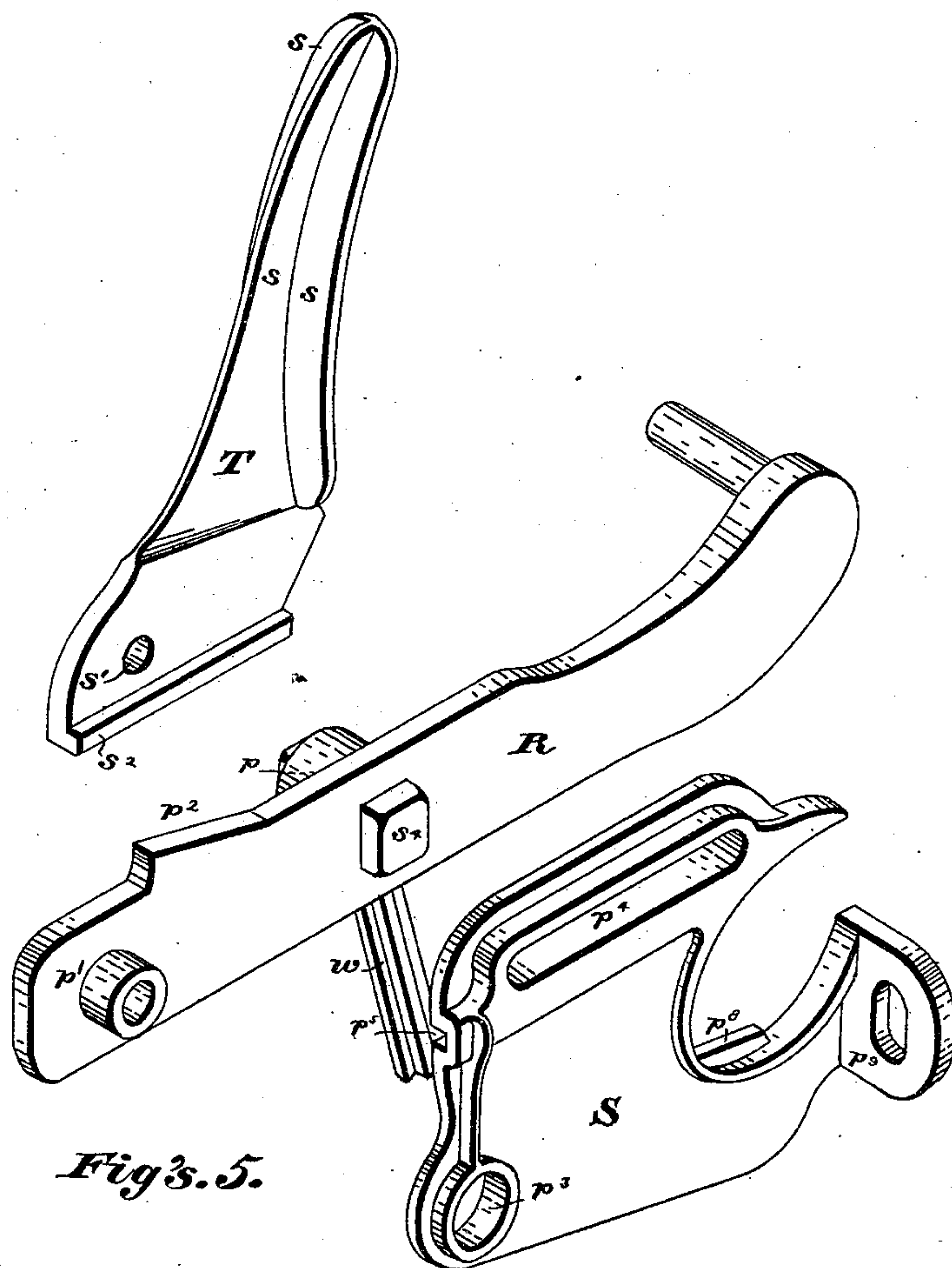
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J. MILLER, Dec'd. 5 S
L. and R. A. MILLER, Administrators.
HARVESTING AND BINDING MACHINE.

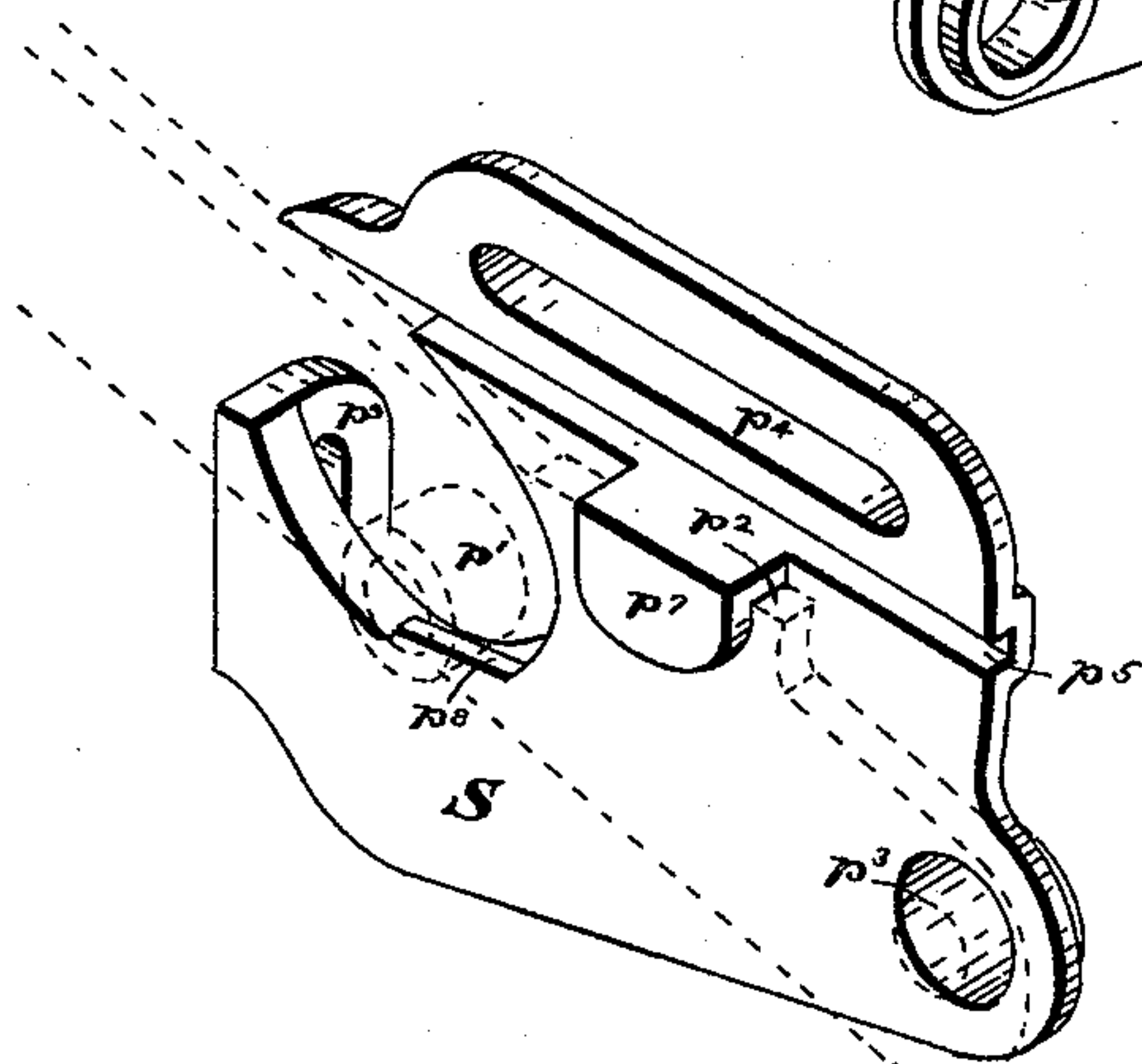
5 Sheets—Sheet 4.

No. 429,045.

Patented May 27, 1890.



Fig's. 5.



WITNESSES:

Harry Grease.
Chas. Miller

Jacob Miller INVENTOR

BY

W K Miller
ATTORNEY

(No Model.)

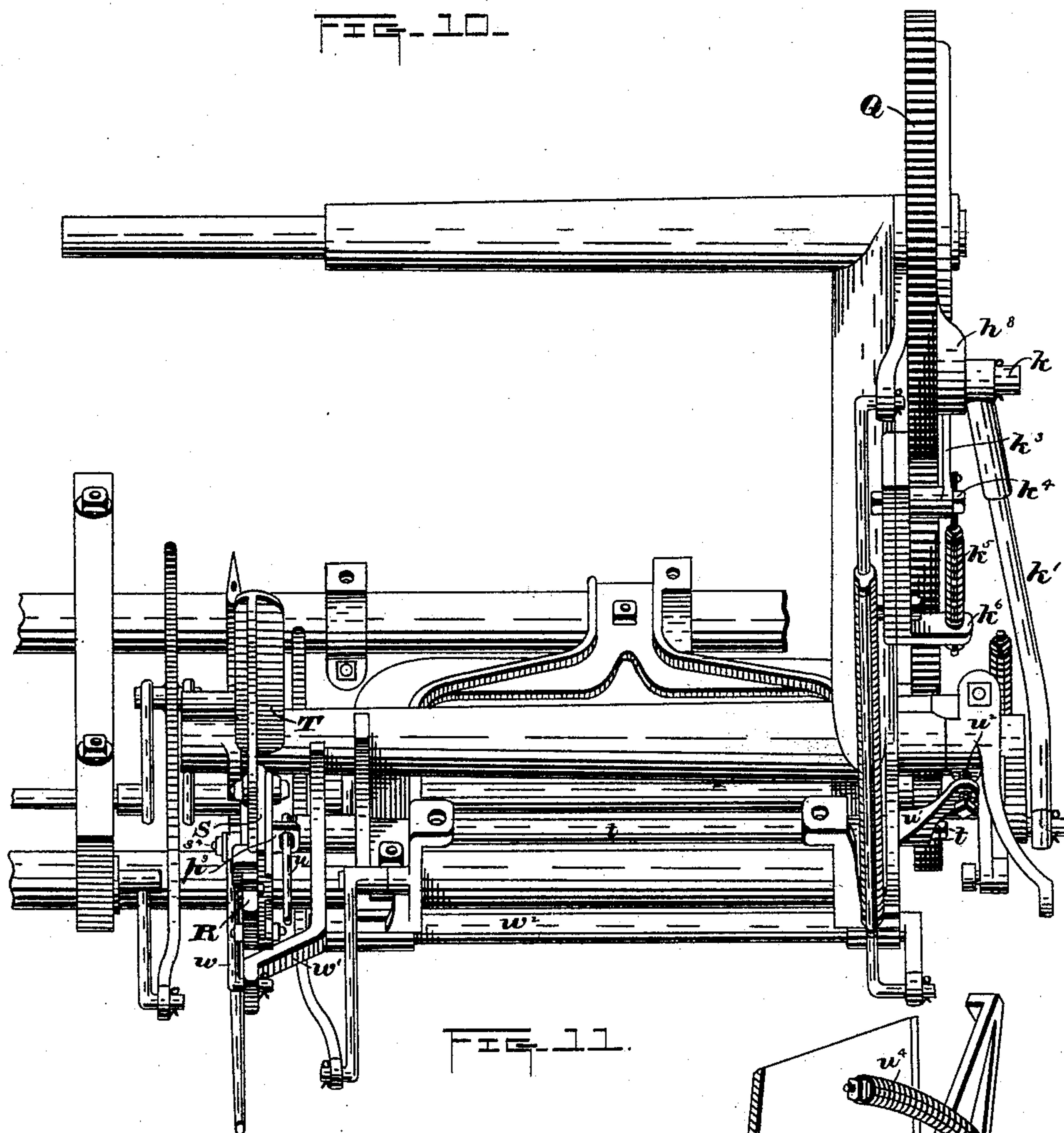
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J. MILLER, Dec'd.
L. and R. A. MILLER, Administrators.
HARVESTING AND BINDING MACHINE.

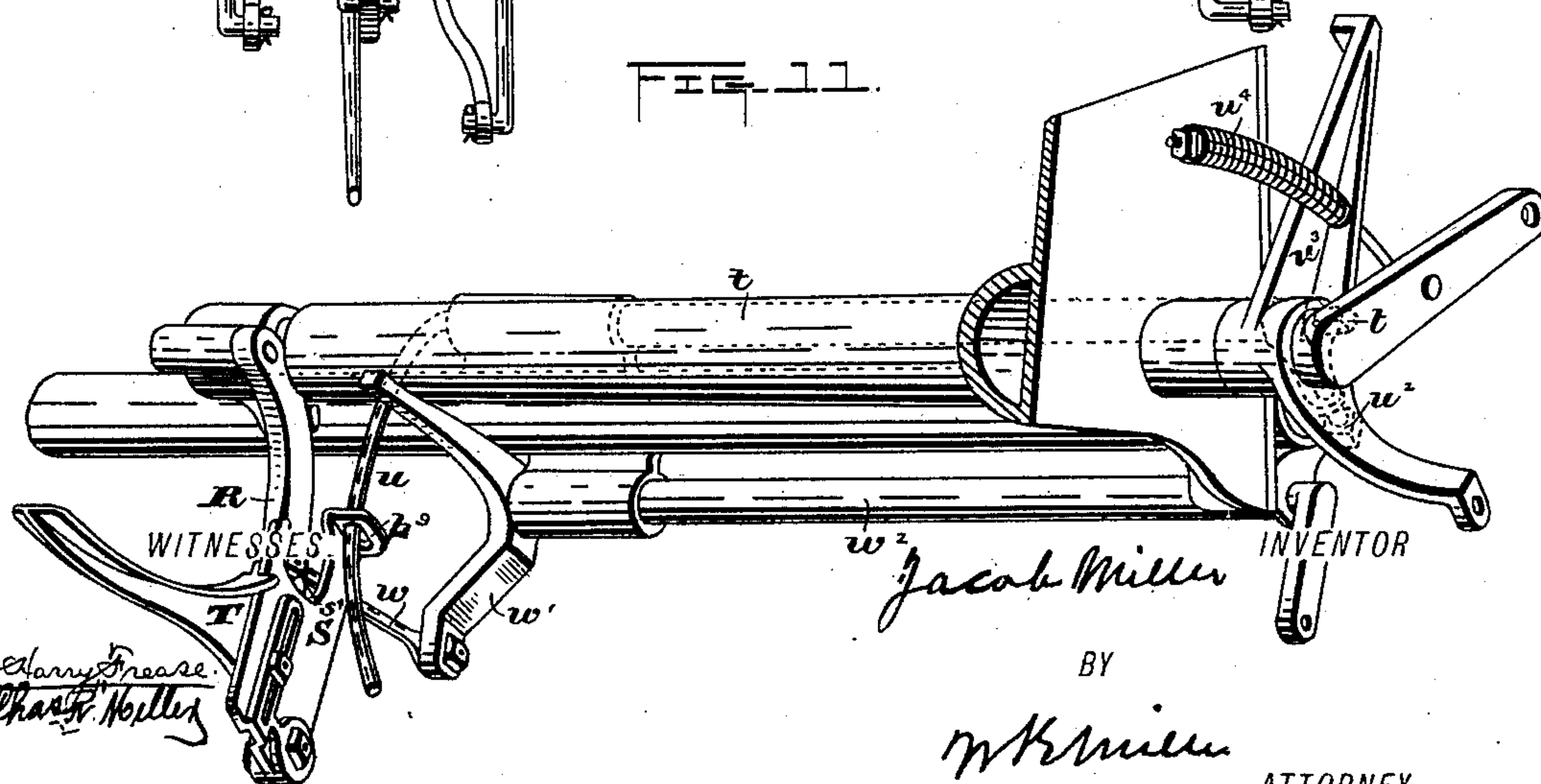
No. 429,045.

Patented May 27, 1890.

Page 10



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Harry Freese.
Chas. F. Hutter

^v 2
Jacob Miller

BY

W. K. Miller

ATTORNEY

UNITED STATES PATENT OFFICE.

JACOB MILLER, OF CANTON, OHIO; LEWIS MILLER AND ROBERT A. MILLER
ADMINISTRATORS OF SAID JACOB MILLER, DECEASED.

HARVESTING AND BINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 429,045, dated May 27, 1890.

Application filed May 16, 1887. Serial No. 238,339. (No model.)

To all whom it may concern:

Be it known that I, JACOB MILLER, a citizen of the United States, and a resident of Canton, county of Stark, State of Ohio, have
5 invented a new and useful Improvement in Harvesting and Binding Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.
10

My invention relates to improvements in harvesting and binding machines, and more particularly to the following parts of machines of the above character, viz: the end frame
15 for the support of the grain-divider and grain-wheel, means for adjusting said wheel, a grain-rake, an automatic cord-tension, the bundle-sizer, the trip, and the compressor.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.
20

Figures 1 and 2 are isometrical views comprising the parts of a harvesting and binding
25 machine involved in this application. Fig. 3 is a side elevation of binder enlarged. Fig. 4 is a view in detail of parts of the tension device. Figs. 5 are perspective views of detached and enlarged parts of bundle-sizer and trip.
30 Fig. 6 is a perspective view of a fragment of platform, canvas, and rake. Figs. 7 and 7^a comprise sectional views of fragment of canvas-slats, showing rake-tooth in vertical and horizontal position. Fig. 8 is a transverse section of angle-iron brace C. Figs. 9 are views
35 comprising detached parts of the grain-wheel support. Figs. 10 and 11 represent the compressor and trip, showing the manner of assembling the parts.

40 Similar letters of reference indicate corresponding parts in all of the figures of the accompanying drawings.

A represents the front sill of the main supporting-frame of the machine, which terminates at the point of connection with the platform-frame; B, the girders by which the front and rear sills are united. These parts may be assembled in the usual way and adapted to support the machinery. Angle-iron frame-pieces C (one of which is shown) are provided
50 as a support for the binder machinery, ele-

vator-frame E, driver's-seat platform D, reel-post, and inside divider D'. The lower ends of said frame-pieces are bolted to the front and rear outside corners of the main frame,
55 either to the girders or sill, or both, if preferred, and are then projected upwardly and over to a point designated as *a*, and downwardly to a point designated as *a'*, and outwardly to a point designated as *a*². There is
60 also provided a corrugated metal side piece E for the elevator-frame, the angle-iron frame-piece C having a riveted or bolted connection with the corrugated side piece, as shown in the drawings. The free or projected ends
65 form a support for the platform D and the inside divider D', the lower end of the corrugated plate E, bolted to the sill A, thus forming a rigid support for the hereinbefore-mentioned parts of the machine, at a greatly-re-
70 duced cost over former methods of construction.

The second feature of my invention relates to the end frame for the support of the outer end of the grain-platform, constructed of metal
75 pipe and in form substantially as shown in the drawings, (see Fig. 2,) the lower member F of the horizontal frame having a portion *b* and an upwardly-projected portion *b'*, terminating in a shoe-piece *b*², and an upper mem-
80 ber G, the front end of which is secured to the shoe *b*² and projected rearwardly and upwardly to a point about midway of the width of the platform, then downwardly to the corner of the platform, at which point there is
85 provided a corner-iron *b*³ as a support for the corner of the platform, and to which the rear ends of the platform-pieces F and G are secured. For the purpose of resisting the inward pressure on the upper frame-piece G,
90 the rear end of said brace may occupy the position shown in dotted lines, the corner-iron being set slanting, as shown. Said corner-iron in either case, as shown, is provided with circular recesses *b*⁴ *b*⁵, in which the ends of the
95 pieces F and G are firmly secured by bolts or clamps, and by which the said parts are secured to the corner of the grain-platform. The front end of the frame is attached to a shoe *b*⁶, secured to the outer end of the fin-
100 ger-bar H'. The grain-wheel support K is secured to the frame substantially as shown,

the support having circular recesses adapted to the size of the frame-pieces F and G, and in which the said pieces are secured. There is also provided at the lower end of the wheel-support K a brace-piece K', connected with and projected from said wheel-support and bolted to the board-work or bottom of the platform, as shown by the dotted lines, thus forming a rigid connection with the platform.

There is also provided a vertical support *i*, adapted to embrace the frame-pieces F and G, having an upwardly-projected portion *i'* as a support for the divider J. The grain-wheel support K is provided with guideways *b*⁸ and a series of cogs *b*⁹. The grain-wheel-spindle-supporting slide L is provided with grooves *d*, adapted to embrace the guideways *b*⁸, and a circular recess *d'*, for the reception of the worm-wheel *d*² and rearwardly-projected frame and housing *d*³, adapted to receive and support the worm *d*⁴ and actuating-shaft *d*⁵. The worm-wheel *d*² and pinion *d*⁶ are integral, and are supported in the recess *d'* by a spindle-bolt *d*⁷, the shaft *d*⁵ extending back to the corner of the platform, terminating in a crank, and handle *d*⁸, by which said shaft may be rotated, and by it the worm *d*⁴, worm-wheel *d*², and pinion *d*⁶, (the cogs of said pinion engaging the cogs *b*⁹ of the support K.) The said support and outer end of the platform may be raised and lowered and fixed in said desired adjustment.

A third feature of my invention relates to improvements in the platform-canvas in providing raking-teeth along the front edge of the platform-canvas D, and which may be applied to the cross-slats *e* or to a special block or devices placed between the slats; but in the present case I prefer to apply them to the front end of the slats *e*, of such number as may be desired, said slat or slats having in their front end a mortise *e'* of the form substantially as shown in Figs. 6 and 7, having one of the ends *e*² larger than the other *e*³, and a central transverse perforation, and a tooth Z, formed substantially as shown, having one of its ends *e*⁴ larger than the other *e*⁵, and a central transverse perforation *e*⁶, to coincide with a perforation in the slat *e*, by which the tooth may have a pivotal connection *e*⁷ with the slat. The ends of the mortise *e'* are beveled, as shown, and the ends of the teeth adapted thereto, (see Fig. 7,) so as to prevent the tooth falling through when passing out on the under side. To the rear side of front frame-piece M is attached guide-piece *e*⁸, the free end of which extends to roller *e*⁹ and outwardly on such an angle as to bring the free end of the said guide under the large portion of the mortise *e'* as the slat is moved over it. As the canvas H is moved across the platform the teeth on the upper side will (by the weighted end *e*⁴) be brought to a vertical position, as shown in Fig. 6, and as they reach and pass over the guide *e*⁸ the lower end of the tooth will be pressed over and up into the mortise, thus folding the upper end of the

tooth down into the mortise, as shown in Fig. 7^a, in which position they remain while passing outwardly on the under side of the platform; but as soon as they have passed over the outside roller they will again assume a vertical position. It will be noticed that the end of the mortise and the tooth are so formed that the beveled end of the tooth will rest on the beveled end of the mortise when passing outwardly on the under side. The object of the tooth is to form a rake by which the butt-end of the cut grain (which is more or less retarded by the uncut) may be moved along at the same rate of speed as the head and to clear the front edge of the platform of an accumulation of short grain or grass.

There is also provided, in Figs. 1, 3, and 4, an automatic cord-tension, of the form substantially as hereinafter described, the object of which is to provide a tension that may be operated by the movements of the binder mechanism.

The tension-frame N is bolted to the binder-frame O. On the projected arm *h* are lugs *h'*, having perforations *h*², as shown. Between said lugs there is a clamping-plate *h*³, which is held in position by the operating-rod *h*⁴. There is also projected from the frame N a stud-pin *h*⁵, that supports and about which a pendent cord-guide *h*⁶ may vibrate. The binding-cord *h*⁷ is passed from the cord-box P (see Fig. 1) through the spring-tension on box P, the perforation in lug *h'*, and between the arm *h* and the clamping-plate *h*³, then through the perforation *h*⁶ in the cord-guide *h*⁷, and thence to the binder.

To operate the tension there is provided on wheel Q a cam *h*⁸, projected from and including a part of the hub *h*⁹, that supports the pin *k*, to which the pitman *k'* is connected. At the point of rest on the cam there is provided a semicircular depression adapted to receive the roller *k*² on the arm *k*³, the other end of said arm having a pivotal connection *k*⁴ with the binder-frame. The coil-spring *k*⁵ rests on the bracket *k*⁶ and is connected with the arm *k*³, as shown, the energy of the spring being exerted against the said arm, which is connected, as shown, to the tension clamping-piece *h*³ by the rod *h*⁴.

The operation is as follows: During the interval of gathering and forming the bundle the wheel Q is at rest, the roller *k*² resting on the depression in *h*⁸, the rod *h*⁴ holding the clamp *h*³ off of the cord *h*⁷ to allow it to yield to the pressure of the packers in forming the bundle to be bound, and when so formed, the binder put into operation, the wheel Q moving in the direction indicated by arrow, the arm *k*³ is released, allowing the energy of the spring *k*⁵ to be exerted through the rod *h*⁴ on the clamping-plate *h*³, thus tightening the cord as it is placed about the bundle and tied.

I have now to describe my improved bundle-sizer, compressor, and trip. The supporting-arm R has a pivotal connection with the hub of the binder-arm, and is provided with thim-

bles p and p' and the flat portion p^2 . Plate S is formed substantially as shown in the drawings, having the perforation p^3 , slot p^4 , groove p^5 , ear p^7 , flat portion p^8 , and the outwardly-projected and perforated lug p^9 . The compressor-arm T is of the form substantially as shown, having the vertical flanges s , perforation s' , and flange s^2 . The parts are assembled as shown in Figs. 3, 10, and 11. The flange s^2 of the arm T is placed in the groove p^5 , in which it may be adjusted to regulate the size of the bundle. Plate S is attached to the arm R by placing the thimble p' in perforation p^3 , and dropping the plate down so as to bring the arm R under the ear p^7 . The link w may be placed on the thimble p and the bolt s^4 passed through and secured. The vibrations of the plate S on the arm R are limited in its downward movement by the flat portion p^2 and the loop p^7 , and the upward movement by the flat portion p^8 and head of the bolt s^4 , at which point it becomes rigid with the arm and acts as a compressor, resisting the movements of the binder-arm during the operation of tying the band, after which the parts will be released and drop down and out of the way of the sheaf, as hereinafter described. On the inner end of the shaft t there is mounted a projected arm u , the free end of which is passed through the perforation in lug p^9 on plate S. On the outer end of said shaft there is provided an arm u' , having on its outer end a setting-bolt u^2 , adjusted to the under side of the locking-arm w^3 , the upward movement of which is resisted by coil-spring w^4 . Link w connects the compressor to the arm w' on the inner end of the rock-shaft w^2 , on the outer end of which there is a similar arm, and a link connecting said arm to a roller in a cam provided in wheel Q, by which the compressor is lowered and raised.

The operation of the trip is as follows: The packers (not shown in the drawings) operate in the usual way, pack the straw against the compressor-arm T, and when a certain degree of compactness has been obtained in the bundle the arm T will be forced back, raising the inner end of plate S up until the plane p^8 strikes the bolt-head s^4 , at which point, the arm u having rocked the shaft t , the locking-arm w^3 is raised, the trip-dog w^5 is released, and the binder mechanism put into operation.

Having thus fully described the nature and object of my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, in an end frame of the harvester-platform, of frame-pieces F and G, shoe-piece b^2 , corner-piece b^3 , vertical brace i , and grain-wheel support k , substantially as set forth.

2. In a harvesting-machine, the combination, with the grain-platform, of a grain-wheel-supporting frame composed of the frame-piece F, having a horizontal portion b , an upwardly-projected portion b' , shoe b^2 , frame-piece G, secured in the shoe b^2 and projected upwardly

and backwardly to a point of connection with the grain-wheel support K, thence downwardly and inwardly to a point of connection with a corner-iron b^3 , a grain-wheel support K, having its upper end connected to the upper frame-piece G, its lower end to the lower frame-piece F, and a brace K' , by which said wheel-support and end frame are rigidly connected to the bottom of the platform, substantially as set forth.

3. In combination, the harvester-platform and the end frame, consisting, essentially, of the frame-piece F, brace G, upright i , wheel-support k , and brace K' , for securing the frame-pieces together and to the platform, substantially as set forth.

4. As a means for adjusting the height of the outer end of the harvester-platform, the combination, with the support K, having guideways b^8 and cogs b^9 , of a spindle-supporting slide L, having groove d , recess d' , housing d^3 , gear-wheels d^2 d^6 , worm d^4 , and actuating-shaft d^5 , substantially as set forth.

5. The combination, with an endless platform-apron and means for actuating the apron, of a swinging rake-tooth carried by the apron, the said tooth being pivoted so as to swing in a plane transverse to the path of the apron, and means for swinging the tooth, substantially as set forth.

6. The combination, with an endless platform-apron and means for actuating the apron, of a cross-slat attached to the apron and having in its front end a longitudinal vertical slot, a rake-tooth pivoted between the walls of the slot upon a single pivot, and means for swinging the tooth, substantially as set forth.

7. The combination, with a harvester-platform canvas, means for operating the canvas, and cross-slats secured to the canvas and provided with slots, of teeth pivotally secured in said slots to swing in planes transverse to the path of the canvas, said pivots being at points to one side of the center of gravity of the said teeth, whereby the teeth are caused to assume upright and horizontal positions by the action of gravity as they are carried by the canvas toward and away from the binder, substantially as set forth.

8. The combination, in a harvester-platform, of an endless canvas, means for actuating the canvas, a series of teeth pivoted transversely in the front edge of the canvas and standing normally vertically, and a guide located on the platform at one end and in the path of the teeth, whereby the said teeth are positively folded to pass around the roller by the engagement with the guideway.

9. In a grain-binding harvester, the combination, with an actuating-wheel Q, provided with a cam, a stationary arm h , and a clamping-piece h^3 , between which and the arm h the binding-cord passes, of a lever pivoted to swing into engagement with the cam on the wheel Q, a spring to retract the lever, and a connecting-rod, whereby the said clamping piece is held released from the cord while the

bundle is being formed and is thrown into contact with the cord when the binding process begins, substantially as set forth.

10. In a grain-binding harvester, the combination, with a cord holding and releasing device, through which the cord freely passes during the formation of the bundle, and a wheel provided with a cam for actuating the cord holding and releasing device, of a lever 5 pivoted to swing into engagement with the cam in the wheel, whereby the cord is held under tension while the needle is placing it around the bundle, substantially as set forth. 10

11. A center compressor and trip composed 15 of the following parts: a supporting-arm R, having thimbles p and p' , a vibrating plate S, having a perforation p^3 , groove p^5 , slot p^4 , flat portion p^8 , ear p^7 , lug p^9 , and a compressor-arm T, having wings s , and a projecting rib s^2 , adapted to be adjustable in the 20 groove p^5 of the plate S, substantially as set forth.

12. A single upwardly-projected trip and compressor, in combination with a vibrating support, a rock-shaft, and means for actuating the rock-shaft, the single trip and compressor being pivoted to the vibrating support and having a limited movement on its pivotal connection, and the vibrating support being connected with the rock-shaft to 25 be elevated or depressed thereby, a trip-lever, a rock-shaft, and arms secured to the rock-shaft, and engaging, respectively, the pivoted compressor and the trip-lever, whereby the compressor yields to the pressure of the straw 30 during the forming of a bundle and exerts its force as a compressor during the tying of the bundle, substantially as set forth. 35

In testimony whereof I have hereunto set my hand this 12th day of May, A. D. 1887.

JACOB MILLER.

Witnesses:

W. K. MILLER,

CHAS. R. MILLER.