

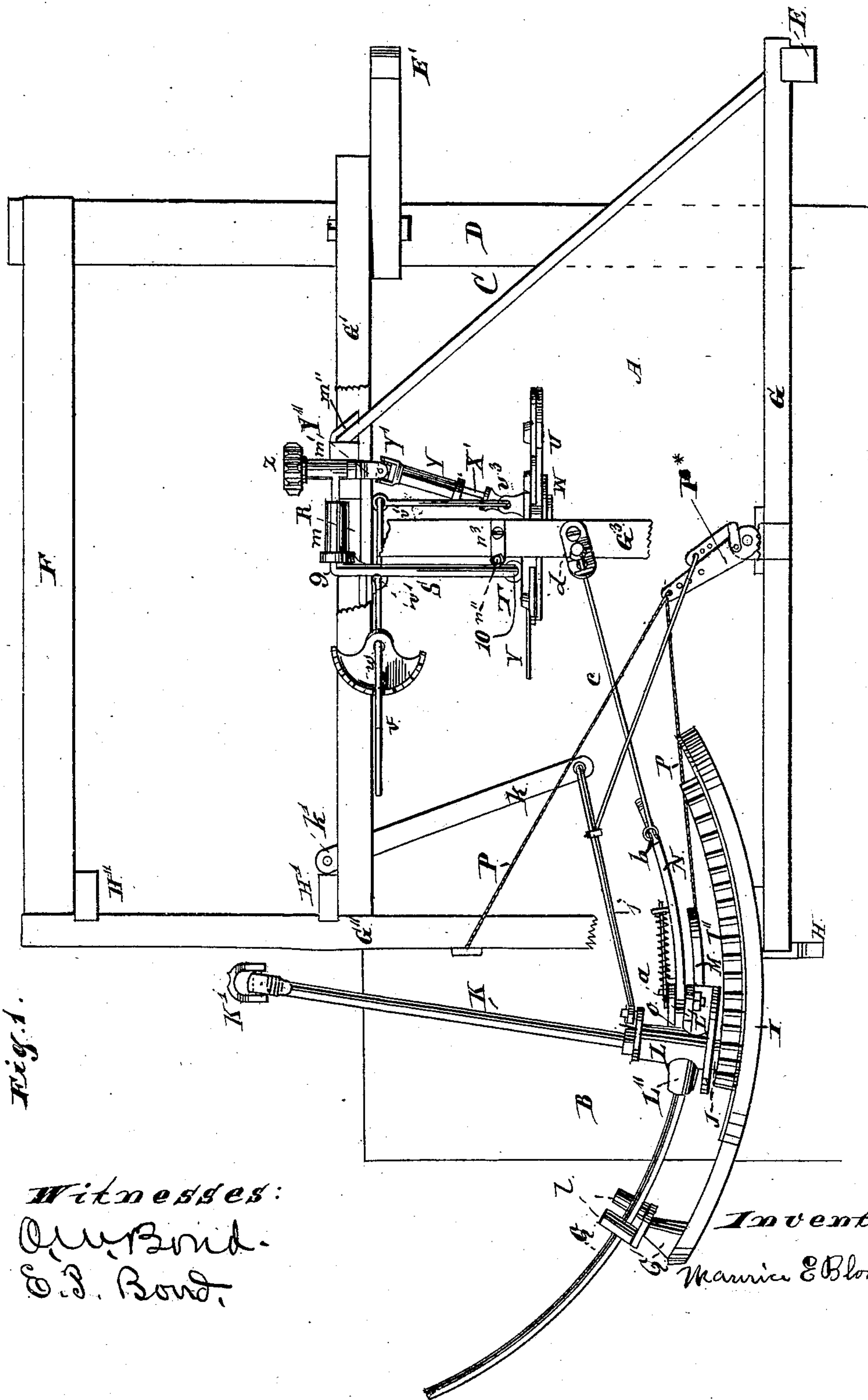
(No Model.)

5 Sheets—Sheet 1.

M. E. BLOOD.
GRAIN BINDING HARVESTER.

No. 275,751.

Patented Apr. 10, 1883.



(No Model.)

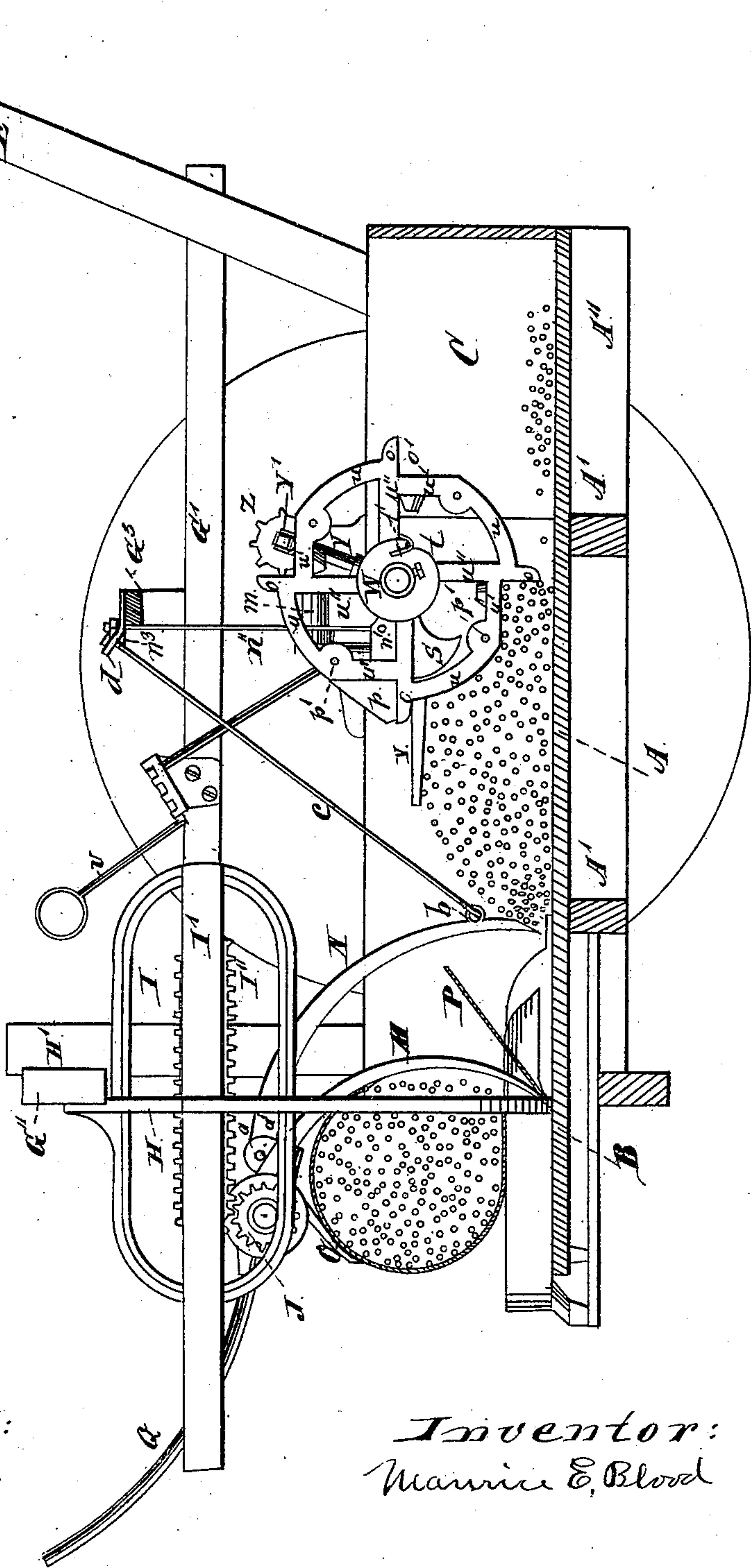
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Fig. 2



Witnesses:
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E. S. Bond.

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(No Model.)

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M. E. BLOOD.

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Fig. 3.

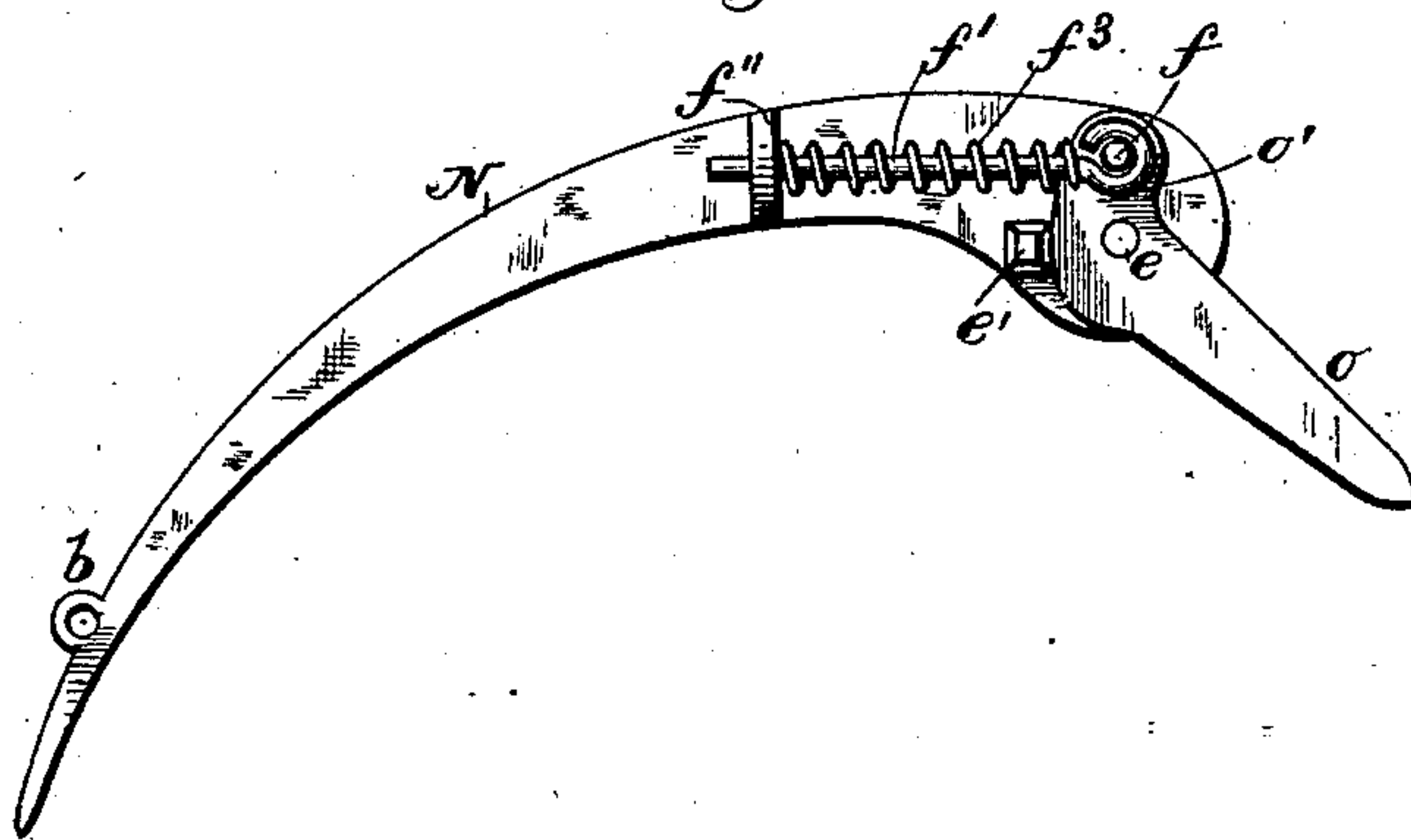


Fig. 4.

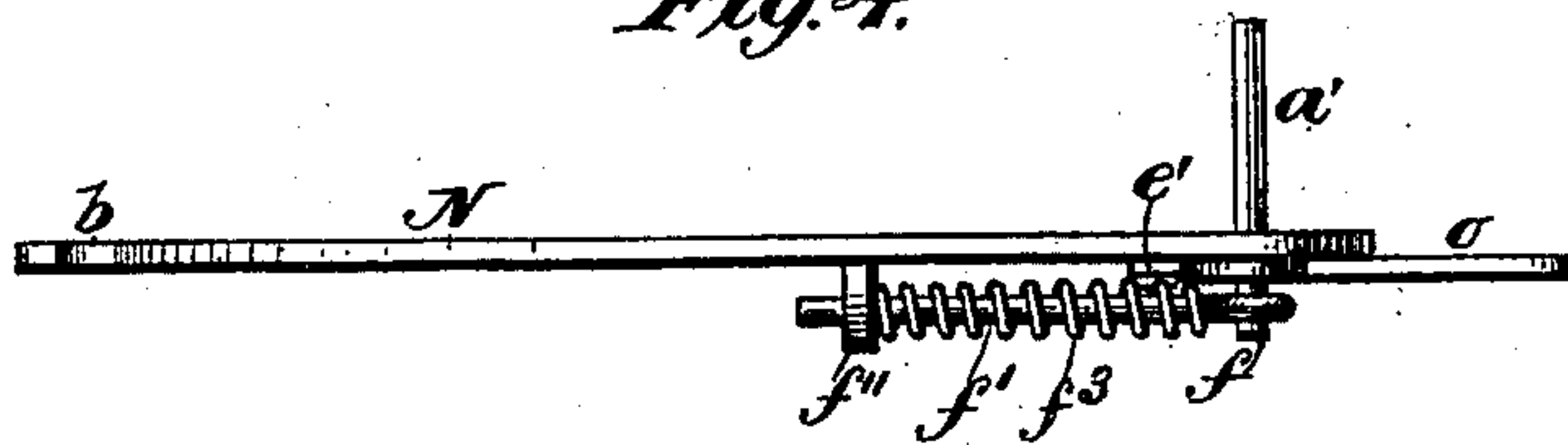
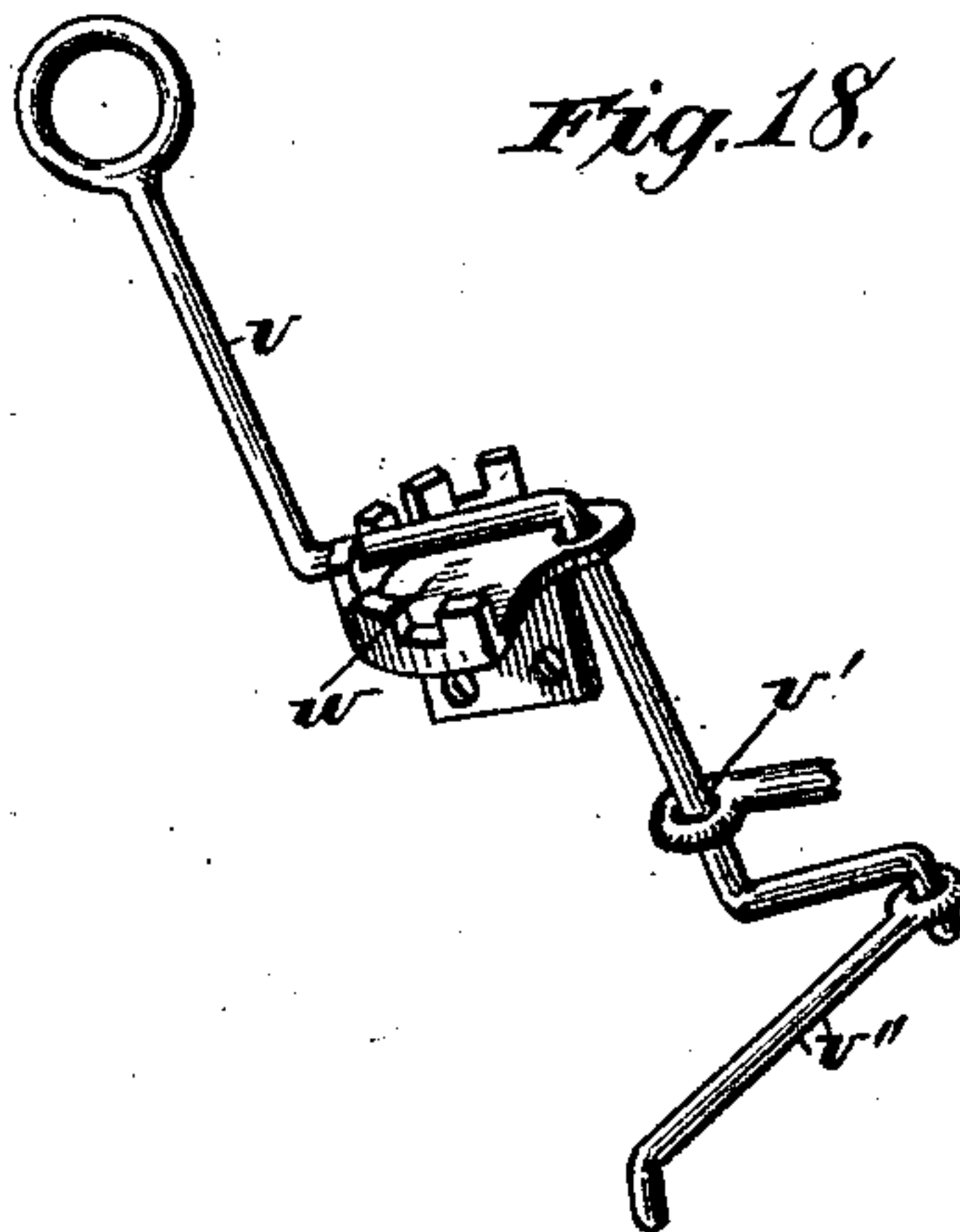


Fig. 18.



Witnesses.

Robert Emmett.

John S. Coombs

Inventor.

Manning & Blood

(No Model.)

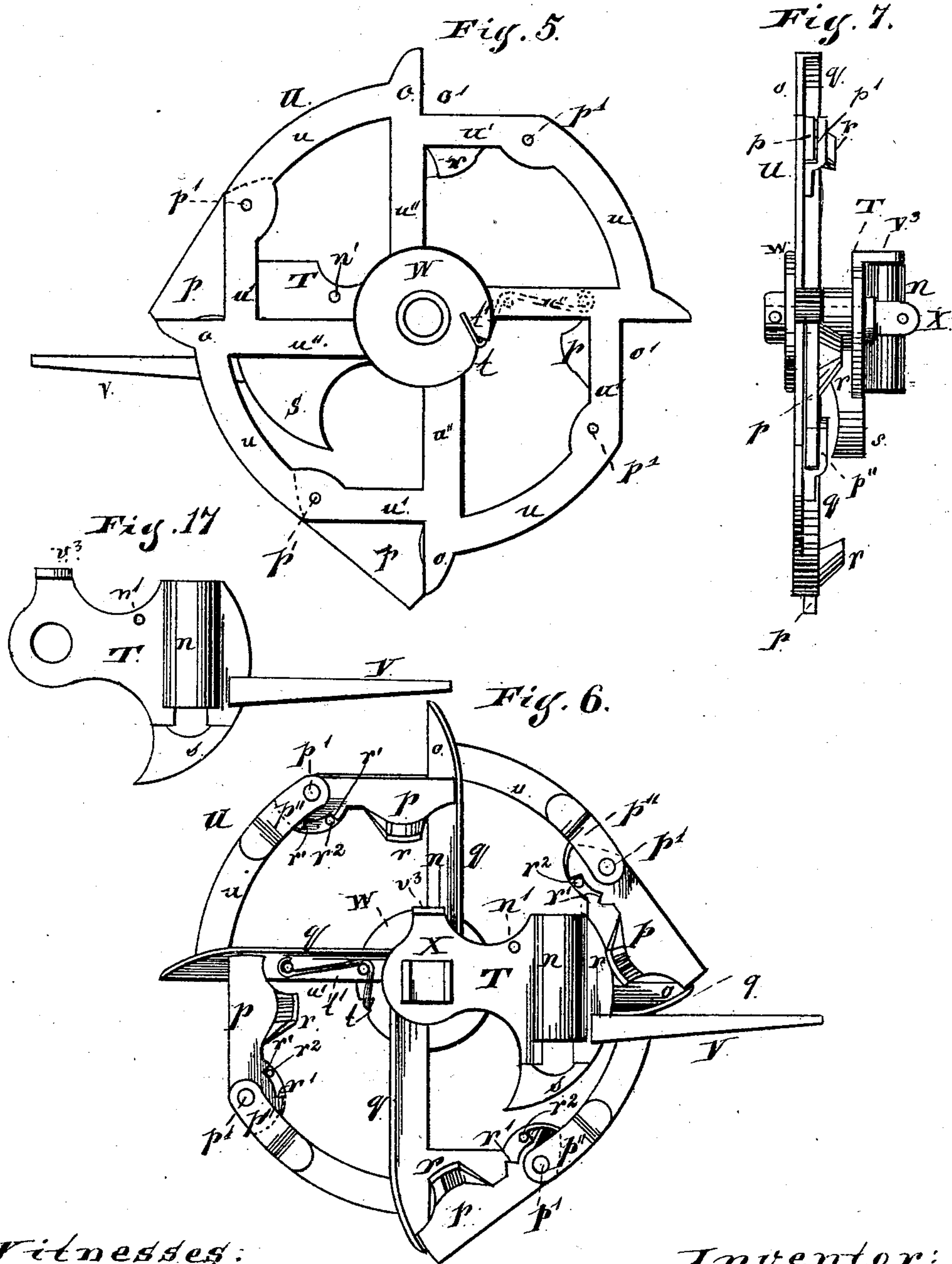
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M. E. BLOOD.

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No. 275,751.

Patented Apr. 10, 1883.



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E. B. Bond.

Inventor:
Maurice E Blood

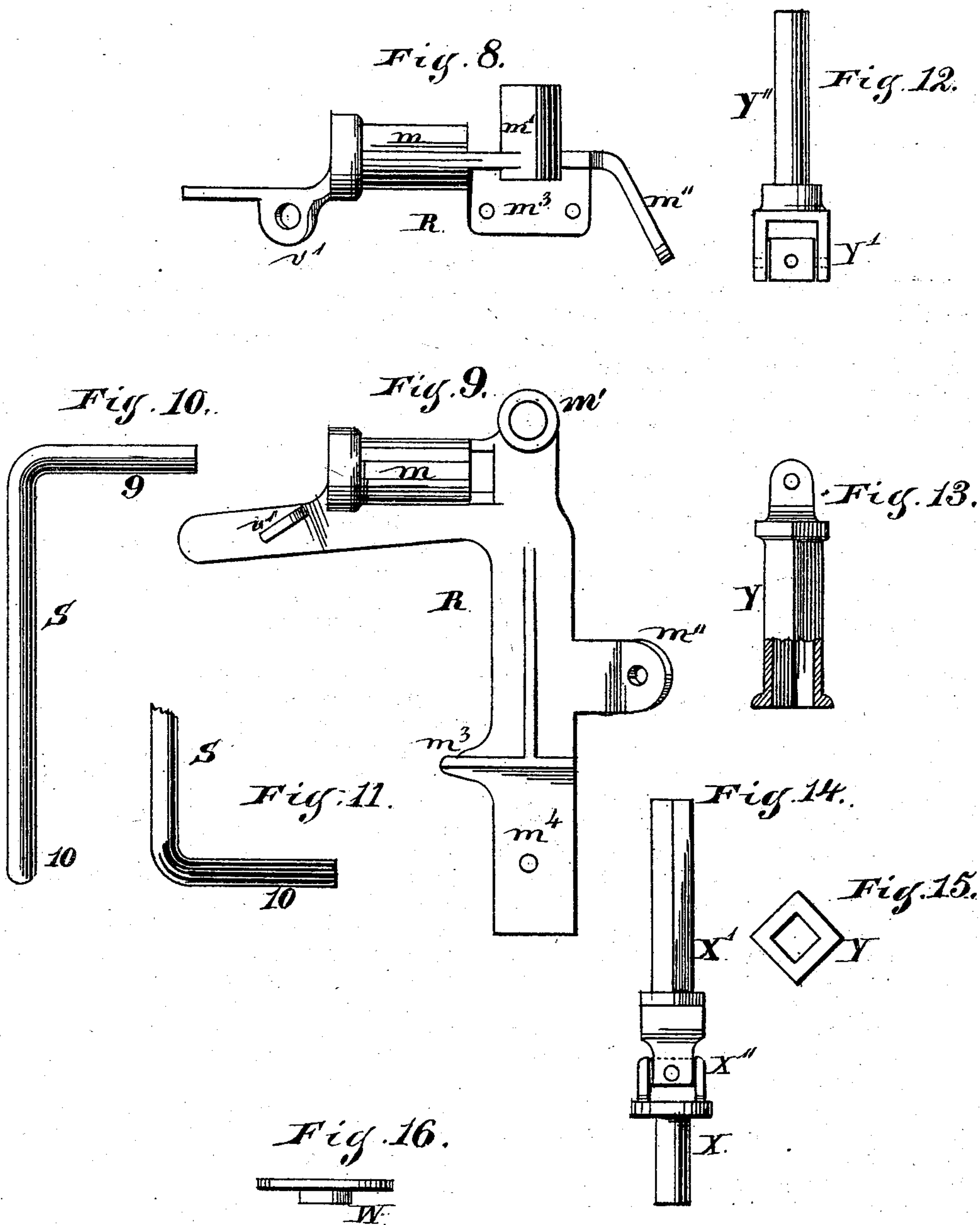
(No Model.)

5 Sheets—Sheet 5.

M. E. BLOOD.
GRAIN BINDING HARVESTER.

No. 275,751.

Patented Apr. 10, 1883.



Witnesses:
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Inventor:
Maurice E. Blood

UNITED STATES PATENT OFFICE.

MAURICE E. BLOOD, OF SYCAMORE, ILLINOIS, ASSIGNOR TO HIMSELF, AND
CHARLES W. MARSH AND WILLIAM W. MARSH, OF SAME PLACE.

GRAIN-BINDING HARVESTER.

SPECIFICATION forming part of Letters Patent No. 275,751, dated April 10, 1883.

Application filed October 9, 1882. (No model.)

To all whom it may concern:

Be it known that I, MAURICE E. BLOOD, residing at Sycamore, in the county of De Kalb and State of Illinois, and a citizen of the United States, have invented new and useful Improvements in Grain-Binding Harvesters, of which the following is a full description, reference being had to the accompanying drawings, in which—

10 Figure 1 is a top view, showing a portion of the frame-work, the receiving-platform, and binding-table, with the devices forming this invention; Fig. 2, a side elevation of the binding-arm and its devices and the separating
15 and grain-packing devices, with the platform and binding-table and their supporting frame-work in section and the main or drive wheel in outline; Figs. 3 and 4, enlarged details, being a side view and edge view, respectively, of
20 the grain-separating arm; Figs. 5, 6, and 7, enlarged details, being respectively side views and an edge view of the packing devices; Figs. 8 and 9, enlarged details, being a top view and a side elevation, respectively, of the
25 frame supporting the driving-shaft of the packer and the pivoted hanger for the packer; Figs. 10 and 11, details, enlarged, of the pivoted hanger for the packer; Figs. 12, 13, 14, and 15, details, enlarged, showing the several
30 sections forming the flexible shaft for driving the packer; Fig. 16, an enlarged edge view of the stationary cap for connecting the packer with its shaft; Fig. 17, an enlarged detail, being a side elevation of the frame or head carrying the packer; Fig. 18, a detached perspective view of the lever and rod for adjusting the packer.

The objects of this invention are to insure a proper separation of the grain for the bundle
40 from the inflowing grain, to insure the proper packing and delivery of the grain for binding purposes, and to improve and simplify the devices by which these objects are attained; and its nature consists in the several devices and
45 combinations of devices hereinafter described, and specifically pointed out in the claims.

In the drawings a complete harvesting-machine is not shown, only so much thereof as is necessary to show the relative arrangement
50 and location of the devices forming this inven-

tion being represented. The parts not shown may be of any of the usual and well-known forms necessary to make a complete machine.

A represents the receiving-platform, supported upon a suitable frame-work formed of
55 sills or timbers A' A''.

B is a binding-platform, which, as shown, is a continuation of the receiving-platform A, but may be independent thereof, if desired.

C is a guard or guide strip, extending across
60 the inner front cover of the receiving-platform, for holding the scattering grain and forming a rest for the butts in being carried around by the platform-rake in position for binding. The platform is designed to be used in connection
65 with a platform-rake, which takes the grain as delivered from the sickle and carries it around so as to lie longitudinally with the sickle-bar on the platform, as is clearly illustrated and described in my application for Letters Pat-
70 ent filed September 5, 1882, Serial No. 41,335.

D is the front lower sill of the machine, to which the sickle is connected; E E', reel-posts supporting a reel, (not shown,) as usual; F, one of the cross-sills, between which and an inner
75 corresponding sill the driving-wheel is located; G, G', G'', and G³, upper frame-pieces supporting the devices; H H' H'', standards or posts supporting the upper frame-pieces, the piece G being supported by the reel-posts E
80 and standard H, the frame-piece G' being supported by the reel-post E' and the standard H', and the frame-piece G'' being supported by the standards H H' H''. A sufficient space is
85 left between the standards H H' for the passage of the grain to the binding devices and the location and operation of the binding and separating arms and their operating mechanism. These parts (represented by the letters
90 D E E' F G G' G'' G³ H H' H'') may be arranged in some other suitable manner adapted to receive and support the sickle, reel, and other devices.

I is a rack-frame, curved longitudinally, and having its ends curved and sides parallel or
95 straight, and supported by the standard H. This frame has a central longitudinal bar, I', on which is a rack, I'', having straight sides and curved ends.

J is a pinion meshing with the rack I''. 100

K is one section of a driving-shaft, on the end of which is secured the pinion J, the other end being provided with one section of a universal joint, K', by means of which a connection is made with the other section of the driving-shaft. (Not shown.) This shaft is to be driven, in any suitable manner, from the main or drive wheel or other movable part of the machine.

L is a head secured to the section K of the driving-shaft, just back of the pinion, so as to turn upon the shaft as the pinion J travels over the rack I'. This head is provided with two bosses or projections, L' L'', on opposite sides of the head.

M is the binding-arm, attached at its upper end in any suitable manner to the boss L', so as to have a rising and falling movement by the oscillation of the head L, by which it will be raised to allow the grain to pass beneath it, and will descend to encompass the bundle with the binding-cord.

N is the separating-arm, pivotally connected at its upper end to a flange, a, on the boss L', and having near its lower end an eye, b, in which is hooked the lower end of a rod, c, the upper end of which passes through a plate or support, d, located on the cross-piece G³. The upper end of the rod c is provided with a head or nut to limit the downward movement of the separating-arm N and retain it while the binding-arm is completing its movement in completing the binding. The upper end of the arm N may have a pivot-pin, a', attached thereto for connecting it with the flange a, a suitable nut or pin being provided to make the connection secure; or it may be pivotally attached in some other manner.

O is a compressing finger or arm, pivotally attached by a suitable pin, e, to the upper end of the arm N, and, as shown, a stop, e', is located on the arm N at the proper point for the end of the compressor O to strike and hold it from a too far downward movement, but allowing it to have a free upward movement, so as to yield to suit the size of bundle. This arm O has an extension, O', upon which is a pin, f, to which is connected, by an eye or in some other suitable manner, one end of a rod, f', the other end of which passes through an ear, f'', on the arm N, and around this rod f' is located a coiled spring, f³, one end of which bears against the ear f'' and the other against the extension O' in a direction to throw the arm O down and hold it against the pressure of the bundle with sufficient force to produce the necessary compression between it and the binder-arm, to take a portion of the strain from off the cord in encircling the bundle.

P is the binding-cord passing from the spool, suitably located on the machine through an eye in the point of the binding-arm to the tying devices, as usual.

Q is a guide-rod, attached at its inner end in any suitable manner to the boss L'', and passing between two anti-friction rollers, l, located on a suitable support, Q', on the end of the

rack-frame I. This rod Q is bent to give the proper swing to the binding-arm.

R is an upright arm or support, of cast-iron or other suitable material, formed as shown in Figs. 8 and 9, or of other form, adapted to be attached to the machine and furnish a support for the hanger and shaft of the packer. As here shown, the arm or support R is provided at its top with sockets or bearings m m', arranged at right angles to each other, or substantially so, and at one side with an ear, m'', through which to pass a bolt for attaching the arm or support to the guide-board C. The arm or support is also provided with a flange, m³, and a shank, m⁴, for attachment to some suitable part of the frame-work of the machine.

S is a hanger, bent at right angles to the body portion at each end, one bent end, 9, entering the socket m of the support R and the other bent end, 10, entering the socket n of the head T, as hereinafter explained.

T is a head or frame, made of suitable material, formed, as shown in Figs. 6 and 17, with the socket or bearing n, to receive the bent end 10 of the hanger S, as before stated. The body of the head or frame is provided with an opening for the passage of the driving-shaft for the packer, and an opening, n', to receive the lower end of a suspending-rod, n'', which is hooked therein, or otherwise attached, to allow some freedom of movement. The upper end of the rod n'' passes through a bracket, n³, attached to the cross-piece G³, the rod passing loosely through such plate, so as to permit of a rising and falling movement of the head or frame T, and being provided on its end with a nut or head to prevent its withdrawal. This vertical movement of the head or frame T is allowed by the turning of the hanger S in the socket m. This head or frame T also has an oscillating movement in a horizontal plane on the bent end 10 of the hanger S through the socket or bearing n. (See Fig. 1.)

U is the packer, made of malleable iron or other suitable material, which can be cast or otherwise formed into the shape shown in Figs. 5, 6, and 7, or shape approximately thereto, having an outer or rim portion divided into quarters, each quarter having a curved portion, u, and a straight portion, u', and connected at the center by spokes or arms u'', which arms extend beyond the periphery of the part u, and form a point, o, the edge of which, adjacent to the edge of the part u', is straight, so as to form with the edge of this part u' a right-angle notch, o', the other edge of each point o being curved. At the juncture of each section u u' is pivoted, by a suitable pin, p', a latch, p, which is held in position against one side of the portions u and u' at its pivoted end, by a plate, p'', attached at one end to the section u by a suitable rivet. These latches are each pivoted so as to drop either out or in as the packer revolves, and the limit of the movement in either direction is stopped by lugs r' on the inner edge of each latch, which engage with a pin, r², secured to the part u'. The free

end of each latch rests on the face of the respective arms or spokes, and, as shown, these spokes are each provided with a flange, *q*, to form a guard for the end of the latches. These latches are for the purpose of clearing the grain from the respective teeth *o* after each tooth has carried the grain to a point where the tooth passes from the grain, which point is that at which the binding-arm enters the grain on the platform, or nearly so, and the latch is thrown out at this point by the engagement of the projection *r* on each latch *p* with a cam, *s*, on the end of the frame *T*, outside of the socket or bearing *n*. This cam is curved, so that as the packer revolves it will act to carry the latch outward, forcing the grain on the tooth off therefrom.

V is a guard arm or finger, projecting out from the end of the frame *T*, under which the grain passes, and by which it is held down while the tooth continues on its movement and passes from the grain.

W is a disk, firmly attached to the end of the driving-shaft for the packer by means of a set-screw or otherwise, and having in its periphery a notch, *t*, one edge of which is straight and the other curved, with which notch the end of a spring, *t'*, engages, which spring is attached in any suitable manner to one of the spokes, *u''*, of the packer. The packer is loose upon its shaft, and this disk *W*, with the notch *t* and spring *t'*, furnish the means for connecting it with its shaft so that it will be revolved in a forward direction. The connection is one which will allow the parts to be disconnected in case the shaft is revolved in a reverse direction—as in backing the machine—allowing the packer to remain stationary. Other forms of connection than the notch and spring could be used that would allow of the automatic connection and disconnection of the parts, and in some cases the packer might be connected directly with its driving-shaft so as to revolve therewith without the use of a disk or other device.

X, Fig. 14, is the driving-shaft of the packer, connected by a universal coupling, *X''*, with one section, *X'*, of the driving-shaft. *Y* is the other section of the driving-shaft, having an opening to receive the section *X'* and allow the two sections to slide in or out to shorten or lengthen the shaft. This section *Y* is connected by a universal joint, *Y'*, with a shaft, *Y''*, which has its bearing in the socket *m'* on the frame or support *R*.

Z is a sprocket-wheel, through which the shaft *Y''* is rotated, imparting rotation to the driving-shaft, and from thence through the shaft *X* and disk *W* to the packer. The packer is suspended from the rod *n''* with a loose connection, as before stated, so that, through the pivotal connection of the frame *T* with the bent end 10 of the hanger *S*, it can be turned so as to stand at different angles in relation to the grain, and thereby be enabled to act on long, medium, or short grain, as required; and this turning of the packer is permitted

through the slide-connection of the two sections *X'* and *Y* of the driving-shaft and the universal joints connecting the several sections of shaft. Other forms and arrangement of driving-shaft could be used, and the frame and the packer could be suspended by some other means than the suspending-rod *n''* and the hanger *S* with the frame or support *R*. By turning the packer so that it stands at different angles in relation to the grain it will be seen that it will also act as a means for changing the direction of the flow of the grain, giving the grain the proper direction for delivery to the binder to be encompassed by the binding-cord at the proper point, and this change in the direction at which the packer stands is effected, as shown, by a lever, *v*, (see Figs. 1, 2, and 18,) located so as to be within reach of the driver, and passing through an eye, *v'*, of the frame or support *R*, and connected at its lower end with a link, *v''*, attached, as shown, to an ear, *v'''*, on the head or frame *T*, located above the coupling of the driving-shaft. By moving this lever in or out at its upper end the operator can turn the packer to any desired angle, and when the proper adjustment is made the lever can be engaged with the proper notch on a rack-plate, *w*, as shown in Fig. 1. Other means than the lever or link can be used for turning the packer.

The operation is as follows: The grain, falling upon the platform as cut by the sickle and deposited by the reel, is swept around by the platform-rake until it lies longitudinally, or nearly so, with the sickle-bar, as in my application for Letters Patent hereinbefore referred to. The packer is given a rotary movement through the flexible shaft connecting it with the sprocket-wheel *Z*, driven by a chain from the reel-shaft or other revolving part of the machine, and this rotation of the packer causes the teeth *o* to successively engage the grain on the platform, as shown in Fig. 2, packing it against the arm *N* when the parts are in the position shown in Fig. 2, but against the binding-cord when the bundle has been bound and the binder-arm and separator-arm have traveled to the upper side of the rack preparatory to making another circuit for again gathering a gavel. The grain caught by each tooth *o* as the tooth passes from the quantity on the platform is cleared from the tooth by the action of its latch *p*, as before described, the grain being held down by the finger *V*. It is desirable to bind the bundle at or near the center, and the packer *U* also serves as a butter, as by turning it, through the lever *v'*, it can be made to engage the grain nearer to or farther from the butts and change the direction of the flow, the engagement nearer the butts acting to push the grain toward the grain-wheel, and the engagement farther from the butts acting to push the grain in the reverse direction, by which it will be seen that the flow of the grain can be changed to cause it to be delivered so that the binding-arm will encompass the bundle with the cord at the proper point

for binding. The suspension of the packer so that it is free to rise and fall enables it to be self-adjusting to suit the thickness of the grain on the platform. The binding-arm in its descent at the forward end of the rack I'' passes through the grain carried forward by the packer at a point within the circle described by the teeth *o*, and after the terminus of the descending movement is reached the pinion J engages the under face of the rack I'', traveling back thereon, carrying with it the binding-arm and the grain encompassed by the binding-cord, as shown in Fig. 2. As the binding-arm descends, the separating-arm N has a corresponding movement, the two arms entering the grain at the same point as they lie side by side, and they continue to move together until the rod *c*, by its engagement with the plate *d*, stops the further advance of the separating-arm, while the binding-arm continues its advance, producing a separation of the inflowing grain from the grain for the bundle, as shown in Fig. 2. The pinion, as it passes around the rear end of the rack I'', raises the binding-arm and the separating-arm, allowing the grain which has been stopped by the separating-arm to come in contact with the binding-cord as the separating-arm and binding-arm are returned to their normal position by the travel of the pinion J on the upper face of the rack I'', the two arms coming together or lying side by side as the pinion J reaches a point at or near the center of the rack, and remaining in that position, so as to enter the grain at the descent of the pinion around the forward end of the rack I'', as just described. The grain for the bundle, caught between the binding-cord and the binding-arm, is pressed by the compressing-finger O against the binding-arm, and this finger O can adapt itself to bundles of different sizes by reason of the yielding connection through the spring *f*³, which spring at the same time also acts to press the finger against the bundle, so as to insure a compression. The compressor-finger being carried by the separator-arm, as the movement of the latter is stopped by rod *c* the binder-arm will continue to advance, the compressor-finger and the binding-arm closing together in a manner similar to a pair of shears, the arrangement being such that as the binder-arm continues to advance the compressor-finger will be caused to gradually increase its pressure by reason of the finger and binder-arm approaching each other, whereby the strain on the binding-cord is relieved and the bundle is made very compact.

As shown, the compressor-finger O is pivotally attached to the separating-arm; but it could be firmly attached or made a part of such arm, and act to compress the bundle when used in connection with a binding-arm working between the compressor and separating portion and against the compressing-finger; but for the best results this compressing-finger should be yielding, to adapt itself to different-sized bundles.

Although the packer is shown in connection with a platform employing a rake, it can also be applied to and used with other platforms using a canvas, chain, or other conveyer for delivering the grain to the binder, its position being changed to suit the construction of the platform used; and other means for changing the angle at which the packer stands can be used instead of the arrangement shown, and the packer could be supported in some other manner than that shown.

In Fig. 1 of the drawings I have shown tension devices, as at P*, for producing a slack in the binding-cord to relieve the strain in tying a bundle and to take up the slack on the return of the binding-arm, but do not here claim the tension devices, as they will constitute the subject-matter of a separate application for Letters Patent.

What I claim as new, and desire to secure by Letters Patent, is—

1. A separating-arm carrying at its pivoted upper end a compressor-finger, in combination with a binding-arm having a movement corresponding with the separating-arm and a further movement independent thereof for compressing and compacting the bundle between the compressor-finger and the binding-arm, substantially as specified.
2. A separating-arm, N, and a stay or stop rod, *c*, in combination with a binding-arm, M, and a compressor-finger, O, carried by the pivoted upper end of the separating-arm for compressing the bundle by the continued advance of the binding-arm, substantially as specified.
3. A rocking or vibrating arm pivoted at a point between its ends to have a portion on one side of its pivot to act as a separating-arm to hold back inflowing grain and the portion on the other side of its pivot to act as a compression-finger on the bundle being bound, substantially as specified.
4. A rocking or vibrating arm pivoted between its ends to have a portion on one side of its pivot form a separating-arm and the portion on the other side form a compressor-finger, in combination with a binding-arm operating to have the separating-arm on one side and the compressor-finger on the other side in advancing to carry the bundle to the binder, substantially as and for the purposes specified.
5. A separating-arm, N, compressor-finger O, pivotally attached to the arm N, and a yielding support for the finger O, in combination with a binding-arm, M, substantially as and for the purposes specified.
6. A separating-finger, N, compressor-finger O, sliding rod *f*', and spring *f*³, in combination with a binding-arm, M, substantially as and for the purposes specified.
7. A separating-arm, N, stay or stop rod, *c*, compressor-finger O, pivotally attached to the arm N, and having a heel or extension, O', against which a pressure-spring acts, in combination with a binding-arm, M, substantially as and for the purposes specified.
8. A separating-arm, N, and a compressor-

finger, O, having a heel or extension, O', and pivotally attached to the arm N, in combination with a stop, e', sliding rod f', and spring f, for limiting the movement of the finger and allowing it to yield to accommodate itself to bundles of different sizes, substantially as specified.

9. A suspended and revolving packer provided with fingers or teeth to engage the grain, and adapted to be turned to stand at varying angles in relation to the grain, for changing the flow of the grain to the binder, substantially as and for the purposes specified.

10. A packer, U, formed of a rim portion, u, u', and arms or spokes u'', with teeth or projections o, and having a rotary movement to cause the teeth to engage the grain and advance it toward the binding devices, substantially as and for the purposes specified.

11. The packer U, having projecting fingers or teeth to engage the grain, in combination with a flexible shafting for rotating the packer and allowing it to rise or fall and be turned to work in different angles in relation to the grain, substantially as and for the purposes specified.

12. A revolving packer having fingers or teeth to engage the grain, and provided with latches to clear the teeth, in combination with the frame T, hanger S, support or standard R,

and a suspending-rod, n'', substantially as and for the purposes specified.

13. A revolving packer having fingers or teeth o to engage the grain, and latches p to clear the fingers, in combination with the frame or support T, hanger S, standard or support R, and supporting-rod n'', and cam or cam-faces on the frame T, substantially as and for the purposes specified.

14. A revolving packer, U, having teeth or fingers o to engage the grain, and latches p to clear the teeth, in combination with cam or cam-faces, frame or support T, hanger S, standard or frame R, supporting-rod n'', and finger or arm V, substantially as and for the purposes specified.

15. A suspending and revolving packer provided with fingers or teeth to engage the grain, in combination with an adjusting-lever and connecting devices for changing the angle at which the packer stands in relation to the grain, substantially as and for the purposes specified.

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Witnesses:

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