(No Model.)

4 Sheets—Sheet 1.

P. F. HODGES.

PLATFORM SELF BINDER.

No. 299,643. Patented June 3, 1884.

Fig. 1.

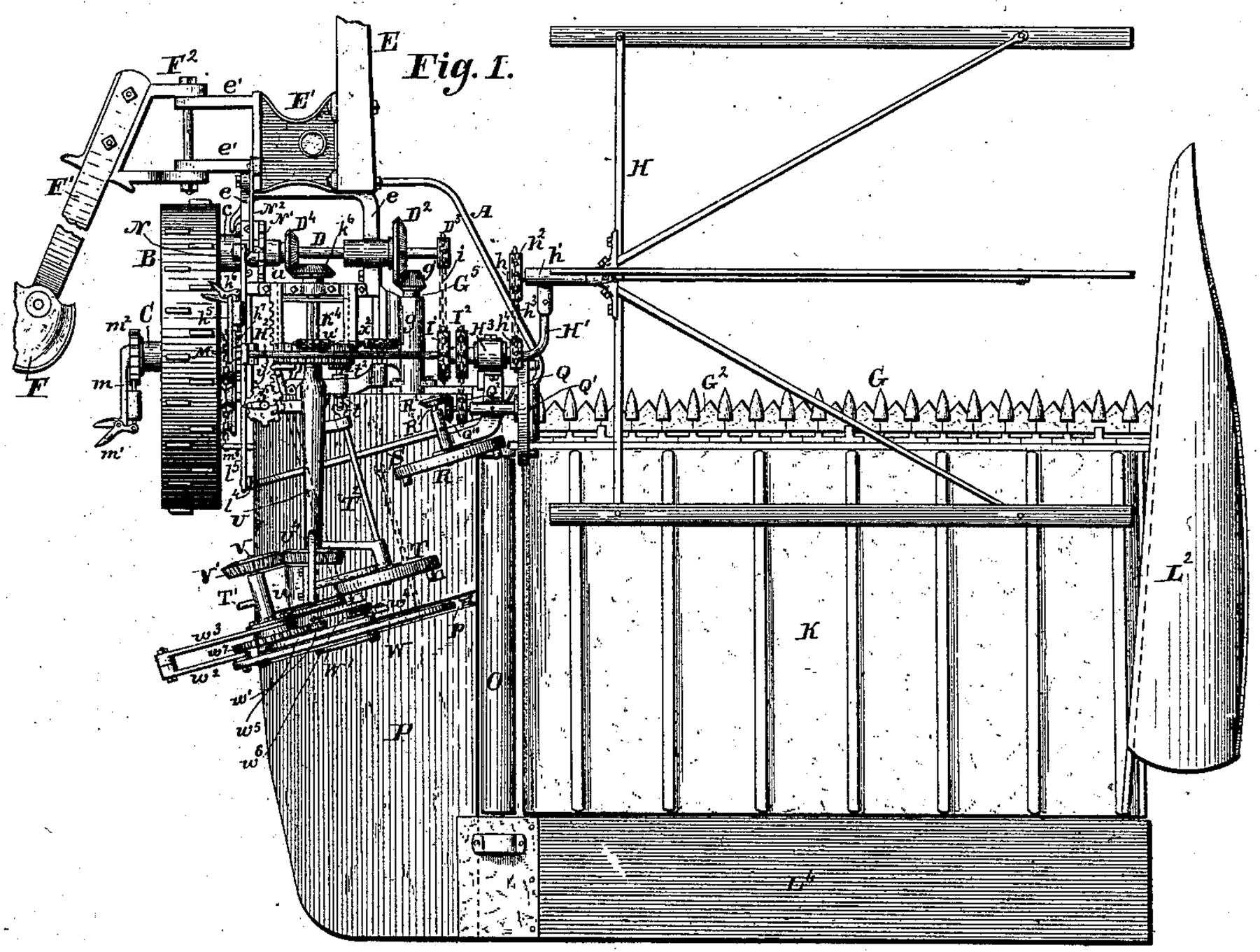
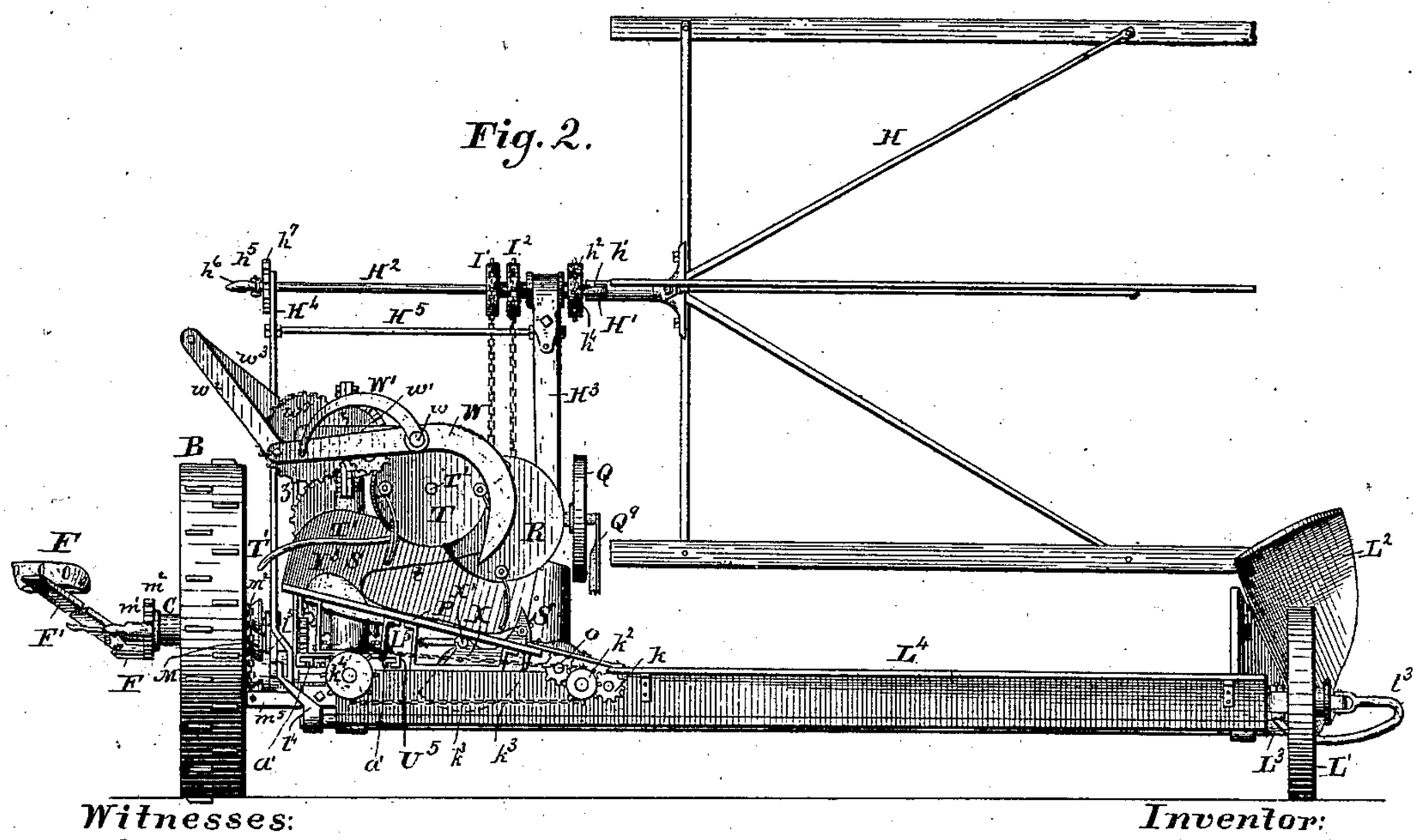


Fig. 2.



Witnesses:
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E. F. Walker

Inventor:
Pliny F Hodges
by
Atty Attorney

(No Model.)

4 Sheets—Sheet 2.

P. F. HODGES.

PLATFORM SELF BINDER.

No. 299,643. Patented June 3, 1884.

Fig. 3.

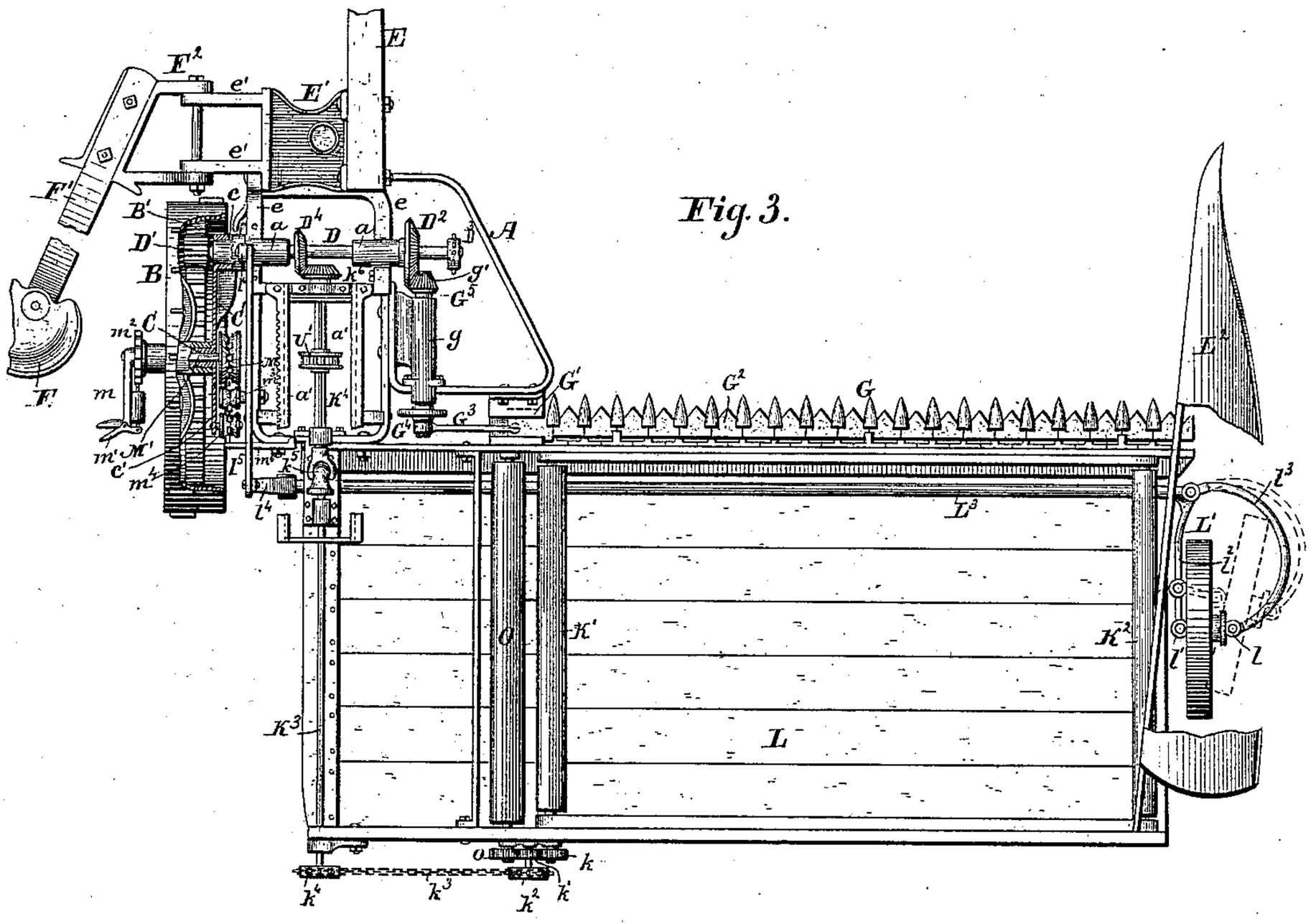
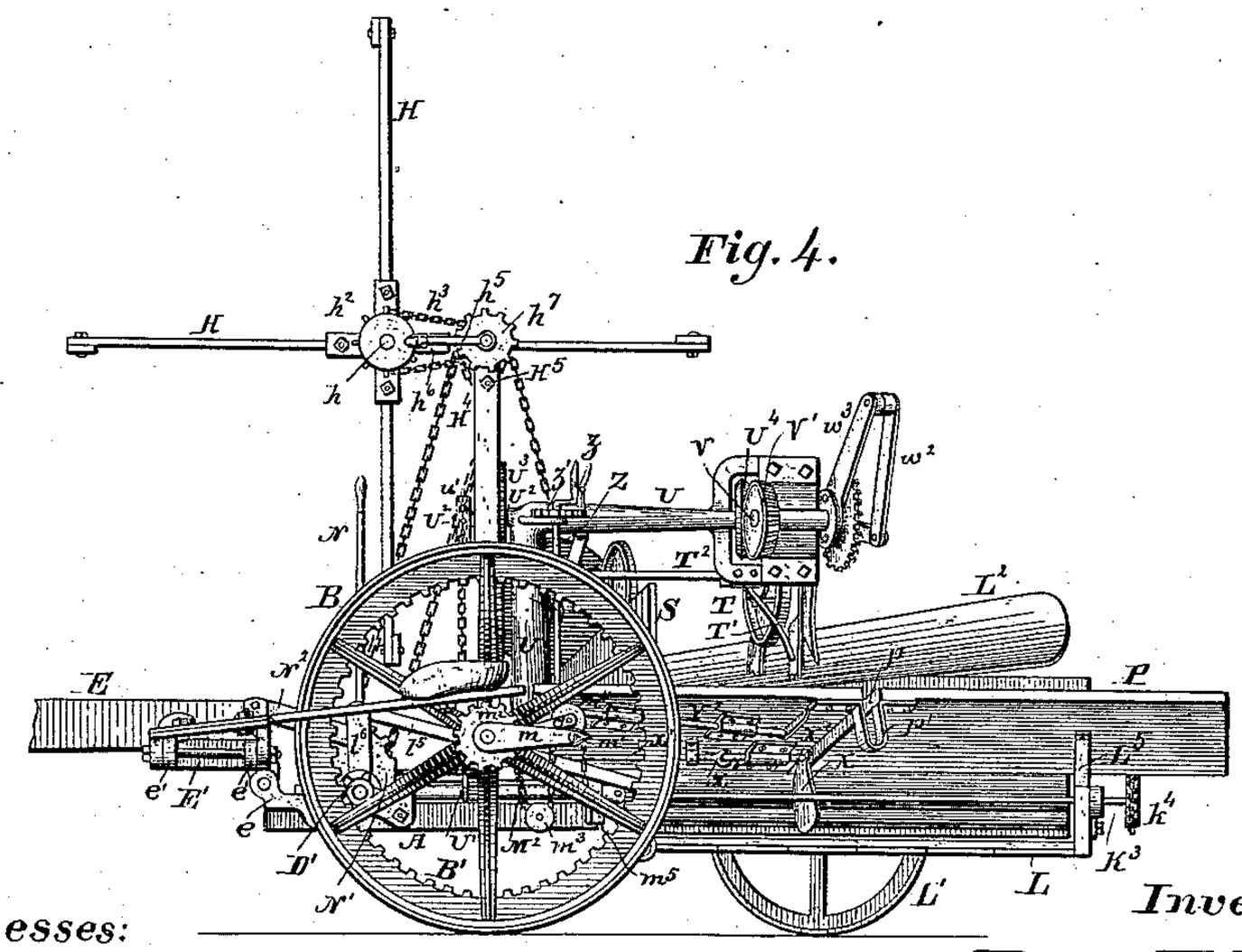


Fig. 4.



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(No Model.) 4 Sheets—Sheet 3.

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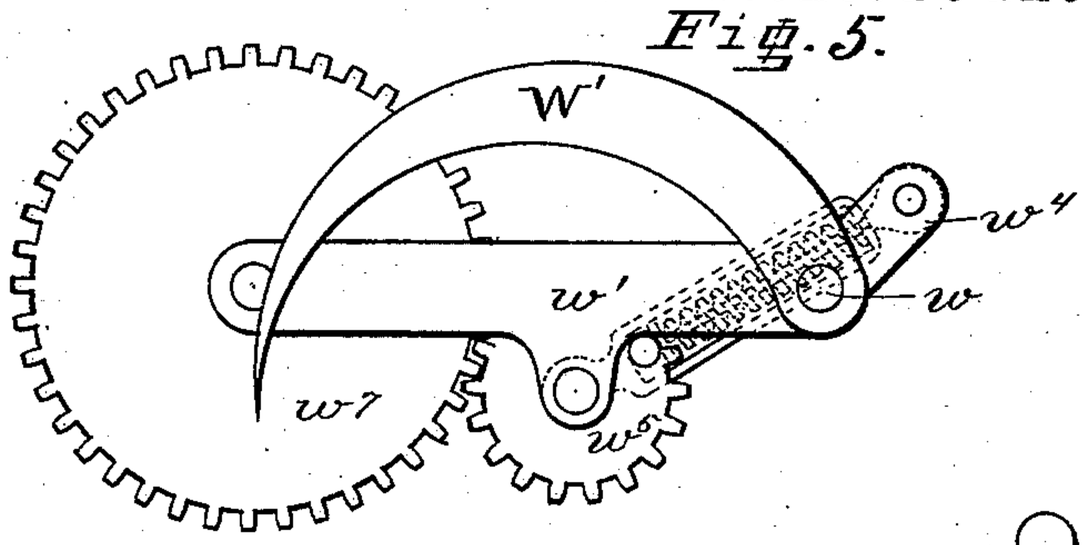
PLATFORM SELF BINDER.

No. 299,643. Patented June 3, 1884.

Fig. 5.



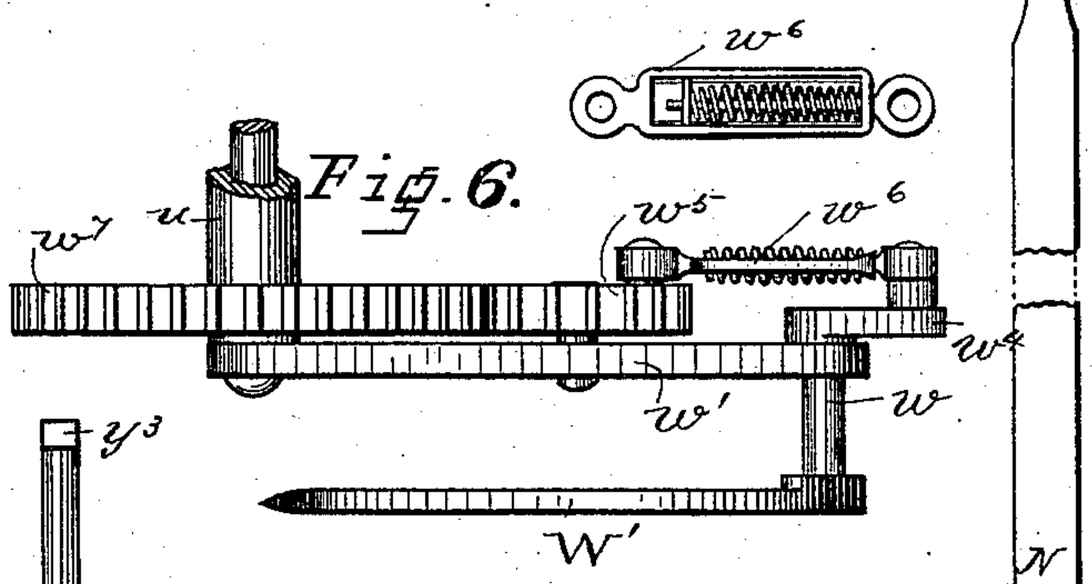


Fig. 6.

Fig. 7

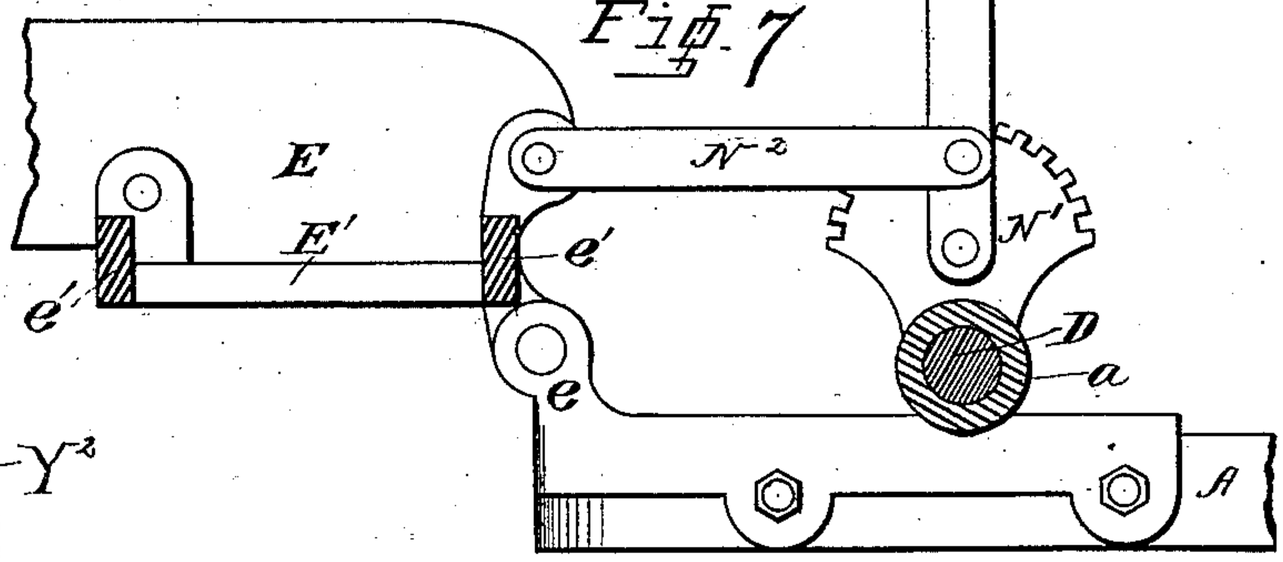


Fig. 12.

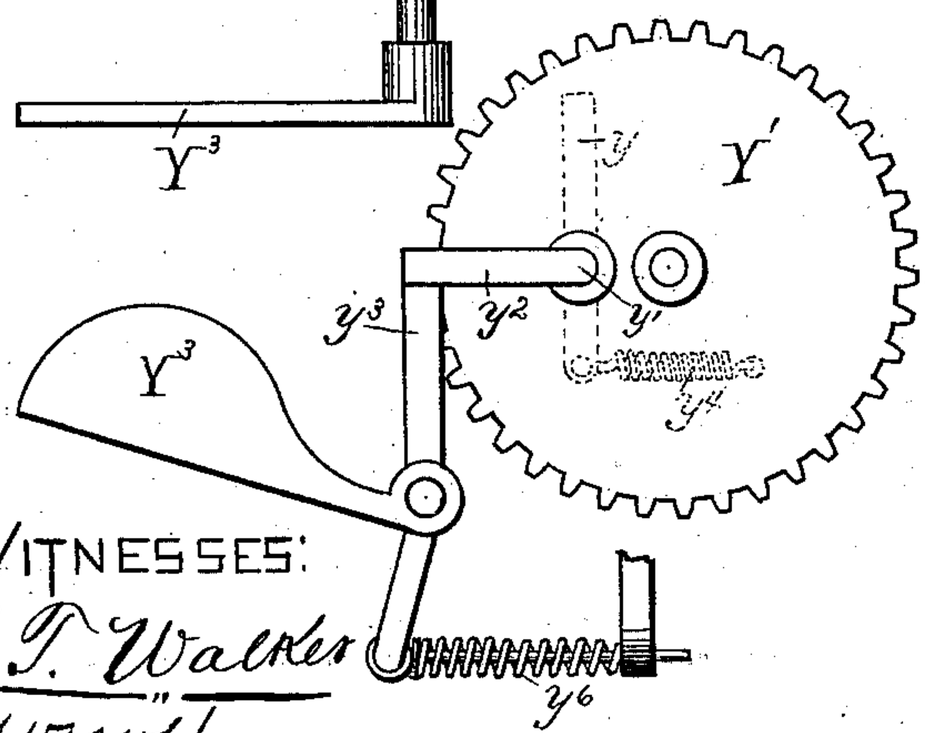


Fig. 11.

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(No Model.) 4 Sheets—Sheet 4.

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PLATFORM SELF BINDER.

No. 299,643. Patented June 3, 1884.

Fig. 8.

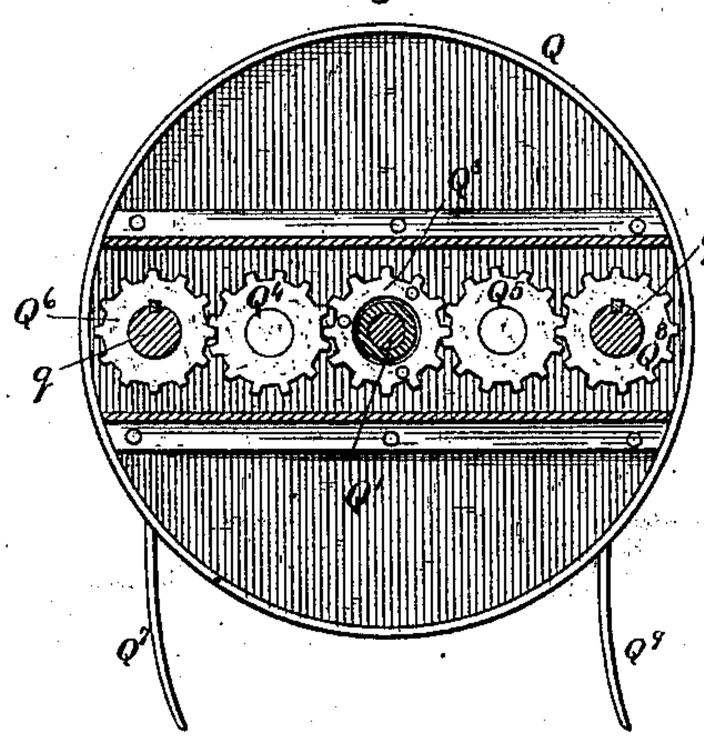


Fig. 10.

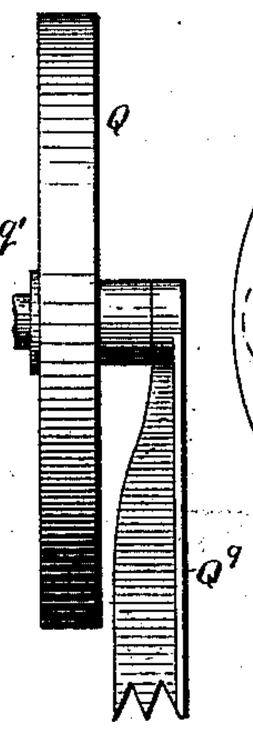


Fig. 9.

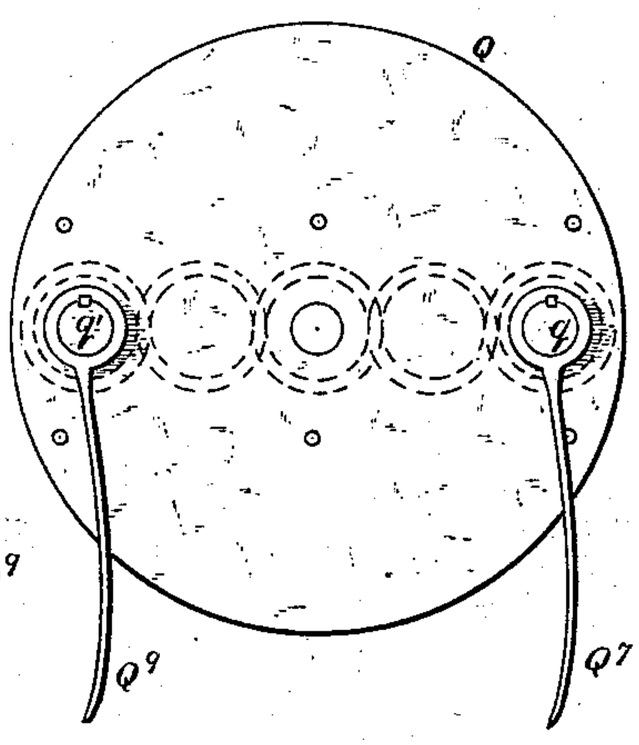


Fig. 17.

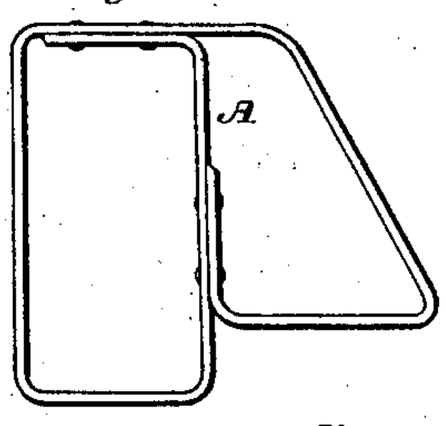


Fig. 13.

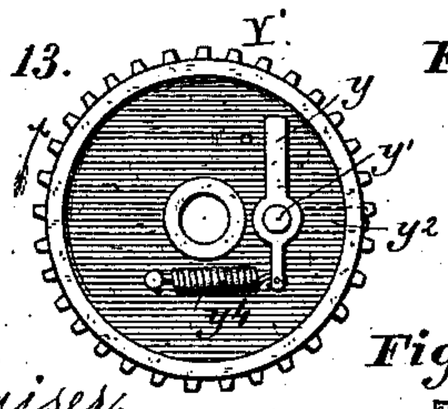


Fig. 14.

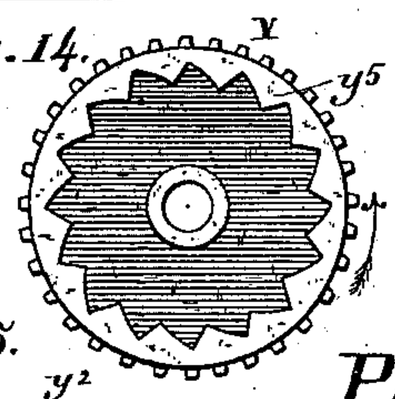


Fig. 16.

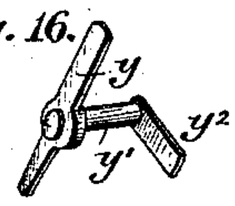
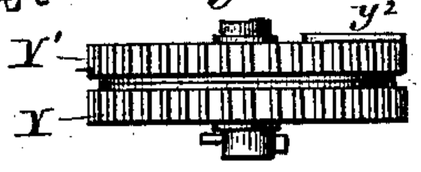


Fig. 15.



Witnesses:

J. Henry Kaiser.

E. L. Parker

Inventor:

Pliny F. Hodges,

by

Atty Attorney.

UNITED STATES PATENT OFFICE.

PLINY F. HODGES, OF CHICAGO, ILLINOIS.

PLATFORM SELF-BINDER.

SPECIFICATION forming part of Letters Patent No. 299,643, dated June 3, 1884.

Application filed June 13, 1883. (No model.)

To all whom it may concern:

Be it known that I, PLINY F. HODGES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Platform Self-Binders; 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 appertains to make and use the same.

This invention relates to that type of low-down or platform self-binding harvesters in which the cut grain is advanced and packed into the binder or binding receptacle on a line oblique to the line of the cutting apparatus by means separate from and independent of the platform-carrier, which merely conveys the cut grain across the platform.

My invention consists, mainly, of a low-down binder in which the devices for advancing the loose grain delivered by the platform-carrier and packing it into a gavel, the binding-arm and the means for discharging the bundle all operate in vertical planes oblique to the line of the cutting apparatus, so that the movement of the grain after it leaves the platform-carrier will be in a rearwardly-oblique direction relative to said platform-carrier. This machine also embodies certain combinations and sub-combinations, which, since they may be used separately, I claim separately, as will be seen by reference to the claims at the close of this specification.

In order that my invention may be clearly understood, I have illustrated in the annexed drawings, and will proceed to describe one practical form thereof.

In Figure 1 is a plan view of my improved self-binding harvesting-machine. Fig. 2 is a rear elevation. Fig. 3 is a plan view minus the carrier-canvas, binding mechanism, and reel, a portion of the main wheel and the divider-board being broken away. Fig. 4 is a stubble-side elevation. Figs. 5 to 17 illustrate details of the machine drawn on a larger scale than the other figures.

The same letters of reference indicate identical parts in all the figures.

The main frame of the machine is composed of a wrought-iron bar, A, bent into the form illustrated in detail in Fig. 17, and a number of castings forming proper supports and bearings for various parts of the machine. The main wheel B turns on a short hollow axle, C, the inner end of which is constructed with a crank-arm, C′, projecting forward and constructed at its extreme end with a sleeve, *c*, which is pivoted on the overhung end of the bearing *a* of the main shaft D of the machine. On the outer end of the main shaft D is a pinion, D′, mounted in the ordinary way, which meshes with the internal gear, B′, of the main wheel B. The tongue E is bolted to the tongue-casting E′, which is pivoted to a suitable casting, *e*, on the main frame. The tongue-casting has laterally-projecting arms *e′ e′*, to which is pivoted the seat-casting F^2, to which the seat-bar F′ is bolted, projecting rearward and carrying the seat F at its extreme elevated rear end, located outside of the main wheel of the machine. In passing through a gate or contracted space the seat-bar and seat may be turned up over the machine, so as to lie inside of the main wheel. The seat-casting (or the arms on the tongue-casting) is provided with suitable stops to stop the seat-casting when the seat is turned out and down.

The cutting apparatus G is constructed at its stubble end with the usual shoe, G′, which is bolted to the angular extension of the main frame A, as best shown in Fig. 3, the finger-bar being extended so that it can be bolted to the rearward portion of the main frame. A cutter-bar, G^2, is reciprocated by the pitman G^3 from the crank-wheel G^4 on the crank-shaft G^5, which turns in a suitable bearing, *g*, of a casting on the main frame. The forward end of the crank-shaft G^5 carries a bevel-pinion, *g′*, which is driven by bevel-wheel D^2 on the main shaft D.

The reel H is mounted on a crank in such a manner that it can be adjusted as to height and fore or aft simultaneously. This mode of mounting the reel will be set forth and claimed specifically in another application. The reel-supporting crank is secured to one end of a shaft, H^2, which extends across from reel-post H^3 to a post, H^4, secured to the stubble side of the main frame, and is provided at its other end with a suitable winch for turning it to effect the required adjustments of the reel.

A horizontal longitudinal platform, L, is

bolted to the finger-bar in the usual manner. The cut grain falls onto a slatted endless carrier, K, stretched on rollers K′ and K², arranged just above the platform L. The roller K′ is provided with a pinion, *k*, which is driven by spur-wheel *k′* on a short shaft, which carries a sprocket-wheel, *k²*, driven by a chain, *k³*, from a sprocket-wheel, *k⁴*, on the shaft K³, journaled in bearings on the stubble side of the platform L. The forward end of the shaft is connected by a separable universal coupling, *k⁵*, to the rear end of the shaft K⁴, supported in suitable bearings on the main frame, and carrying at its forward end a bevel-pinion, *k⁶*, which is driven by a bevel-wheel, D⁴, on the main shaft D. The grain end of the cutting apparatus and the platform is supported upon the grain-wheel L′, arranged under the divider-board L².

The mode of mounting the grain-wheel will be described and claimed specifically in another application, together with the mechanism for raising and lowering the main frame and cutting apparatus, which application was filed in the United States Patent Office February 15, 1884, Serial No. 120,812.

The main frame and cutting apparatus and parts attached thereto may be tilted, so as to dip the cutter-bar more or less for leveling it by means of the tilting-lever N, which is pivoted to a toothed arc, N′, fixed on the bearing *a* on the main frame, and provided with a spring-latch adapted to engage the teeth of the arc. The tilting-lever is connected by a link, N², to the tongue-casing E′. By reference to the drawings it will be observed that if the grain passed in a direct straight line from the platform-carrier to the binding apparatus, and after being bound in a bundle were discharged in the same line, the butt-end of the bundle would overlap the main wheel, and it would therefore be necessary to leave quite a wide space between the edge of the binder-table and the main wheel for the proper discharge of the bundle, thus greatly increasing the width of the machine. On the other hand it is very desirable to place the axis of the grain-wheel no farther to the rear of the axis of the main wheel than is absolutely necessary, in order to make the machine as short as possible, so that it can be balanced on its wheels to the best advantage. In order to shorten up the machine to the extent shown in the drawings without widening it to provide a space between the binder-table and the main wheel for the discharge of the bundle, I give oblique direction to the flow of the grain on the binder-table relatively to the platform-carrier, and form and discharge the bundle at a backwardly-inclining angle to the flow of the grain on the platform-carrier, so that the bundle will be discharged in the rear of the main wheel, in consequence of which the outer side of the binder-table may lie close to the main wheel. The cut grain is delivered on an endless carrier to a roller, O, which in turn moves it up onto the binder-table P, arranged at a slight inclination, as best shown in Fig. 2. The journal at the rear end of the roller O projects through its bearing and carries a pinion, *o*, driven by the spur-wheel *k′*. The binder-table projects some distance beyond the rear edge of the platform-carrier, and an elevated extension-board, L⁴, is secured to the rear end of the platform L, in order to give support to long grain.

In the practical operation of the platform grain-carrier it is found that there is a tendency for the butt-ends of the grain to project forward somewhat at the stubble end of the cutting apparatus. To correct this, by pushing the grain back I provide what I term an "endwise butter." The endwise butter shown is composed of a disk, Q, (see Figs. 8, 9, and 10,) fixed to a shaft, Q′, mounted in a bearing of a bracket or brace on the reel-post H³. Shaft Q′ carries a sprocket-wheel, Q², which is driven by a chain from a sprocket-wheel, I², on the reel-driving mechanism. A spur-wheel, Q³, is fixed to the bearings of shaft Q′ in the center of the disk Q. The disk is provided with idle-wheels Q⁴ and Q⁵ on opposite sides of the spur-wheel Q³, with which they mesh. These idlers turn loosely on studs fixed to the disk. The idler Q⁴ drives spur-pinion Q⁶, keyed to a short shaft, *q*, to the outer end of which is fixed a rake-tooth, Q⁷, adapted to project beyond the periphery of the disk. The idler Q⁵ drives a spur-wheel, Q⁸, keyed to a shaft, *q′*, to which is fixed another tooth, Q⁹, also adapted to project beyond the periphery of the disk Q. The number of teeth may be increased, if desirable. It will be understood that in the rotation of the disk the teeth are turned in such a way that they are alternately projected outward beyond the periphery of the disk, to operate on the ends of the grain, and retracted within the periphery of the disk as they rise, and that they are constantly maintained in pendent positions, so that they will operate on the grain without much of a lifting action. As the grain is delivered on the binder-table by the roller O, its butt-ends are operated upon by what I term a "butt-hastening rake," R, in this instance constructed precisely the same as the endwise butter just described. A shaft, R′, is mounted on the same bracket which supports the shaft of the endwise butter, and carries a bevel-wheel, R², which is driven by a bevel-wheel, Q¹⁰, on the shaft of the endwise butter. The axis of the butt-hastening rake is arranged at an angle to the axis of the roller O, so that it will swing or deflect the butts around on the binder-table, and thus arrange the grain obliquely on the binder-table at an angle to the flow of the grain due to the action of the platform-carrier. The butt-hastening rake is assisted in its action by the obliquely-arranged fixed butt-board S, placed across the forward end of the binder-table, as best shown in Fig. 1. This butt-board is fixed to the

main frame of the machine, and the end next to the cutting apparatus is curved forward, as indicated in Figs. 1 and 2, so as to provide an easy passage for the butts of the grain from the platform-carrier to the binder-table. A shield is placed over the shoe G′, extending to the binder-table in the ordinary manner. By the time the butt-hastening rake has arranged it obliquely on the binder-table the grain is brought within the reach of packer T, which packs it into a gavel against the binding cord or wire *t*, and under the overlying arms T′.

The packer illustrated is constructed like the butt-hastening rake heretofore described, being provided with teeth that perform the packing operation. The axis of the packer T is parallel to the axis of the butt-hastening rake, and at right angles to the butt-board. The shaft T^2 of the packer turns in bracket-bearings formed on the binder-frame U, its forward end being connected by a universal joint, t', to a shaft, t^2, also supported in a bearing of the binder-frame, and provided at its forward end with a spur-pinion, which is driven from one of a train of spur-wheels, which gives motion to the binding mechanism, the primary wheel of which is marked U′, mounted on the shaft K^4. The last wheel U^3 of this train is secured to the forward end of the longitudinal shaft U^2, which turns in a horizontal rearwardly-projecting elevated arm of the binder-frame, and carries at its rear end a bevel-wheel, U^4. It will be observed that the axis of this shaft U^2 is parallel with the main wheel or at right angles to the cutter-bar. Ordinarily the binding-arm is arranged to operate at right angles to this shaft. This arrangement of the binding-arm could be employed in this machine; but for various reasons it is desirable to so arrange the binding-arm that it will operate in a plane parallel to the butt-board, or, in other words, at right angles to the packed gavels. This might be effected by arranging the shaft U^2 at the proper angle; but that necessitates a very considerable widening of the machine, which is very objectionable. To overcome this objection I employ the ordinary arrangement of the main binder-shaft U^2 and operate the binding-arm from a counter-shaft, V, which is arranged at the required angle to the main binder-shaft U^2, so as to be capable of operating the binding-arm in the desired vertical plane. The oblique counter-shaft is placed at the side of the main binder-shaft remote from the stubble end of the platform-carrier, for the purpose of obtaining the requisite width between the platform-carrier and the point where the bundle is bound. This counter-shaft is driven by a bevel-wheel, V′, meshing with a bevel-wheel on the rear end of the main shaft. It is mounted in a suitable bearing of a bracket-frame, *u*, on the rear end of the elevated overhanging arm of the binder-frame. The binding-arm W is pivoted at *w* to the outer end of a crank-arm, *w′*, fixed on the rear end of the counter-shaft V. The shank of the binding-arm extends beyond its pivoted point *w*, and is at its rear end connected by link w^2 to the rigid arm w^3, fixed on the binder-frame.

It will be observed that by reason of the mechanism just described the binding-arm will be moved not only with an ascending and descending, but also with a backward and forward, motion. In consequence of this mode of operation the binding-arm also serves the purpose of discharging the bundle after it has been bound. A discharging-arm, one or more, may, however, be employed, if deemed advisable.

To the pivot *w* is fixed at one end a compressor-arm, W′, which travels with the binding-arm and is rocked thereon, to close toward, and then again open away from, the curved end of the binding-arm, by means of a crank-arm, w^4, fixed to the other end of the pivot-pin *w*. Crank-arm w^4 is connected to the crank-pin on a planet-wheel, w^5, by a connecting-rod, w^6, composed of two bars and a stiff spring, so that under ordinary circumstances the two bars of the connecting-rod operate like a single rod, and when great pressure is brought to bear on the compressing-arm W′, by reason of an unusually large bundle having been packed, the spring in the connecting-rod will yield and allow the sectional connecting-rod to elongate, and thus relieve the excess of pressure on the compressing-arm. The planet-wheel w^5 is journaled on the crank-arm *w′*, and gears with the fixed sun-wheel w^7, secured on bracket-frame *u*. The planet-wheel is so proportioned with reference to the sun-wheel that in making one orbit around the latter it will make two rotations on its axis, thus closing and opening the compressing-arm twice, once while the binding-arm is down, applying the cord, and the second time while the binding-arm is elevated, and not until the bundle has been discharged. This mode of operation enables me to close and open the compressor-arm with the required rapidity for effectively compressing the bundle. The second closing and opening of the compressor during the elevated position of the binding-arm might be obviated, as by itself it serves no useful purpose, by the use of suitable stop or delay gearing applied in manner well understood. Instead of the compressor-arm described, any ordinary compressor can readily be applied by any one skilled in the art. A diagonal slot, *p*, is cut in the binder-table to allow the binding-arm to pass down below the top of said table. The binding-cord, taken from a reel or from balls placed in suitable cups arranged under the binder-table, is conducted through a suitable guide-eye; also, under the binder-table, up through the slot *p*, and to the point of the binding-arm, where the end is held by a suitable cord-holder of a suitable knotter carried by the binding-arm, not shown, the guide-eye referred to being so arranged that the cord reaching from it to the

binding-arm will pass through said slot *p* at about the middle of its width. In order that the flow of the grain into the binding mechanism may be stopped and a clear space provided between the flowing grain and the gavel to be bound for the descent of the binding-arm, I provide what I term a "cut-off," X, having a segmental form, substantially as shown in Fig. 2, one end terminating in a sharp point adapted to readily pass through the grain. It is fixed to the shaft X', arranged under the binder-table, and being parallel to the counter-shaft V, so that the cut-off operates in a vertical plane parallel to or coincident with the vertical plane in which the binding-arm moves.

Fig. 2 shows the position of the binding-arm and cut-off just after the binding mechanism has been put in motion. In the normal position of the parts the binding-arm is more elevated, and the sharp point of the cut-off is just beneath the top of the binder-table, so as not to obstruct the flow of the grain toward the binding-cord. The radius of the cut-off is such that its outer edge reaches just beyond the line where the packer-teeth take hold of the inflowing grain, so that when the cut-off is turned up through the binder-table it will stop the flow of the grain at a point where it is out of the reach of the packer-teeth, and the continuous operation of the packer-teeth will maintain a clear space between the cut-off and the previously-packed gavel, through which clear space the binding-arm descends to apply the cord and tie the knot. In this manner I obviate the serious difficulty which has always heretofore been encountered in binding mechanisms where the knotter is carried in the binding-arm of stuffing portions of the grain through the slot in the binder-table, and thus clogging the operation of the binder. In this instance a complete rotation is given to the cut-off during each operation of tying a bundle, the shaft X' of the cut-off being connected at its forward end by a universal joint, *x*, to a longitudinal shaft, *x'*, the forward end of which is suitably supported in a bearing on the binder-frame, and carries at its forward end a sprocket-wheel, x^2, driven by a chain from a sprocket-wheel, *u'*, on the forward end of the main binder-shaft U^2. The speed of the cut-off relative to the speed of the binding-arm is such that the latter will keep in advance of it during the movements of the two, and so avoid interference. In order that the lower strand of cord may be properly presented to be caught by the binding-arm, a tucking device is used for pushing this lower strand up through the slot in the binder-table. For this purpose an independently-operating device may be employed; but the presence of my cut-off X enables me to make it perform the function of a tucker as well. To this end I attach, on one side of the cut-off, near its sharp point, a lateral projection, preferably in the form of a grooved roller, which, traveling with the cut-off in the plane in which the cord is stretched, catches the under strand, as shown in Fig. 2, and presses it upward as required.

The shaft K^4 rotates continuously, while the binding mechanism is required to operate periodically. To this end the second wheel Y of the train for driving the binding mechanism, which is driven by the primary wheel U', is connected with the third wheel Y' of the train by an automatic clutching mechanism. (See Figs. 13, 14, 15, and 16.) To this end a pawl, *y*, is pivoted by a pin, *y'*, to the wheel Y', projecting into a recess in the wheel Y. The pivot-pin *y'* projects through the wheel Y', and is constructed with a crank-arm, y^2, adapted to come in contact with and to be stopped by a crank-arm, y^3, on the forward end of a shaft, Y^2, arranged in bearings under the binder-table, and provided at its rear end with an arm, Y^3, which, in the normal position of the shaft Y^2, projects up through the binder-table, as shown in Fig. 2. A spring is suitably applied to the shaft Y^2 to hold it normally in such a position that the arm Y^3 projects up through the binder-table, as shown in Fig. 2, in which position the end of its crank-arm y^3 is located in the path of the crank-arm y^2 on the pivot-pin of the pawl *y*. A spring, y^4 is applied to the pawl *y*, tending to throw the point of the pawl into engagement with an internal ratchet-wheel, y^5, formed on the wheel Y. As long as the crank-arm y^3 stands under the crank-arm y^2 the pawl *y* is held out of engagement, and at this time the weight of the binding-arm tends to turn the train of wheels in a forward direction and the wheel Y thereof in the direction indicated by the arrow in Fig. 13, so that the crank-arm y^2 will be held down on the crank-arm y^3. When a gavel of determined size and compactness has been packed in the binding-cord against the arm Y^3, said arm yields to the pressure of the bundle, turning the shaft Y^2 in opposition to the stress of its spring y^6, so as to turn the crank-arm y^3 from under the crank-arm y^2. Immediately spring y^4 throws pawl *y* into gear with the ratchet-wheel y^5, and the wheel Y, being thereby brought into driving-connection with the wheel Y', starts the latter, and through it the balance of the train of wheels, for driving the binding mechanism. The gavel is bound and the bundle discharged during one rotation of the wheel Y', so that by the time the crank-arm y^2 of the pawl *y* reaches its normal or first position shaft Y^2 has been turned back by its spring, so as to place its crank-arm y^3 again in the path of the crank-arm y^2, and stop the forward movement of the latter, so as to disengage the pawl *y* from the ratchet-wheel y^5, and thereby stop the further movement of the wheel Y' and bring the whole binding mechanism to a stand-still. The spring-shaft Y^2, with its arm Y^3 and its crank-arm y^3, constitutes an automatic trip for operating the automatic clutch.

The binder-table is fastened to suitable supports formed on or secured to the base-plate U^5 of the binder-frame. By this base-plate the binder-frame is mounted on parallel rails or ways a' of the main frame. A rack is formed on one of the rails a', which is engaged by a pinion on the lower end of an upright shaft, Z, supported in suitable bearings on the binder-frame. The upper end of the shaft is provided with a spring-latch lever, z, the spring-latch of which is adapted to engage the teeth of a wheel, z', fixed to the binder-frame. By turning the shaft Z in one direction or the other the whole binding mechanism may be adjusted in the longitudinal direction of the machine, for the purpose of locating the binding-arm at the best point for binding the gavel of grain, according as the machine is operating on short or long grain. The rear end of the binder-table runs loosely on the support L^5, mouuted on the rear board of the platform L. The slot p extends entirely across the binder-table, and the parts thereof are reconnected by suitable irons, the outer end of which is in the form of a loop, p', as shown in Fig. 4, to leave room for the proper operation of the binding-arm.

The primary wheel U′ is connected to the shaft K^4 by feather and groove, so that it may be slid on said shaft, and is provided with cheek-plates for embracing the wheel Y, so that in adjusting the binder the wheel U′ will slide back and forth with it and maintain its driving-connection with the wheel Y. The wheel Y, running loose on its shaft, is held thereon by linchpin, as shown in Fig. 15. When the binder is to be disconnected from the machine, this linchpin is withdrawn, so that the wheel Y may be slipped off its shaft and afterward lifted from between the cheek-plates of the wheel U′.

Some capacities of the machine thus described not already referred to should be mentioned. The reel is so hung on a crank and its shaft driven at a point outside the reel-post that it—the reel—can be adjusted through an entire circle which the crank is capable of describing around its axis. The binder and the cutting apparatus can be easily separated from the main frame and from each other for convenience of transportation. All the adjustments of the reel, main frame, and cutting apparatus and binder can be effected by the driver without leaving his seat, all the levers for the accomplishment of these adjustments being within his reach.

For effecting the angular movement of the grain from the platform-carrier to and through the binder I prefer to operate the butt-hastening rake, the packer, and the binding and discharging arm all in planes oblique to the line of the cutting apparatus; but I have used the butt-hastening rake arranged parallel to the platform-carrier in practical operations in the field with an earlier machine. In that case it had the effect of angling the grain in consequence of its comparatively-rapid motion. My primary or broad claim for a butt-hastening rake will be found in a separate application for a patent filed February 13, 1884, Serial No. 120,597.

In lieu of the particular form of the butt-hastening rake any other known form of rake may be used. The location of the butt-hastening rake may also be changed to suit circumstances and the views of the different constructors and users, provided it overlies or underlies the grain-passage, so that the grain must pass across the teeth of the rake.

More than one packer may be used if found desirable, and the particular form of the packer shown may be replaced by any other known form of packer. Furthermore, the packer may be operated from underneath the binder-table instead of above it.

I do not confine myself to the particular form of binding-arm shown and described, or to the location of the binding-arm over the binder-table, since it is apparent that other known forms of binding-arms operating either from above or from below the binder-table may be used without changing the general nature of my machine.

I am aware of prior patents illustrating low-down binders, in which the grain is moved by the platform-carrier into a binder, the binding-arm of which is illustrated as operating in a vertical plane oblique to the line of the cutting apparatus. From such machines mine is clearly distinguished by the important circumstance that the grain is carried to and packed into the binder by devices separate from and independent of the platform-carrier.

Certain novel features in the construction and mounting of the seat will be claimed in another application filed by me February 15, 1884, Serial No. 120,812. Certain combinations, of which the stripping-roller and the automatic trip respectively form ingredients I have used in a prior machine, for which I filed an application for United States Letters Patent April 9, 1884, Serial No. 127,217, wherein such combinations are claimed; hence I do not claim them herein.

Having thus described my invention, what I claim is—

1. The combination, substantially as before set forth, of a butt-hastening rake and a packer, both arranged as described, so as to move in vertical planes oblique to the line of the cutting apparatus and operating mechanism.

2. The combination, substantially as before set forth, of the binder-table, the oblique butt-hastening rake suspended above it, and the oblique packer.

3. The combination, substantially as before set forth, of the endwise butter and the independent butt-hastening rake.

4. The combination, substantially as before set forth, of the endwise butter, the independent butt-hastening rake, and the packer.

5. The combination, substantially as before

set forth, of the endwise butter, the binder-table, the oblique butt-hastening rake, and the oblique packer.

6. The combination, substantially as before set forth, of the endwise adjustable binder, the fixed oblique butt-board, and the fixed oblique butt-hastening rake.

7. The combination, substantially as before set forth, of the endwise adjustable binder, the packer connected to and adapted to move with the binder in adjusting the same endwise, the fixed butt-board, and the fixed butt-hastening rake.

8. The combination, substantially as before set forth, of the adjustable binder-table, the oblique packer connected to and adapted to move therewith, the fixed oblique butt-hastening rake, and the fixed oblique butt-board.

9. The combination, substantially as before set forth, of the binder-table, the oblique butt-hastening rake suspended above the same, the oblique packers, and the oblique binding-arm.

10. The combination, substantially as before set forth, of the main binder-shaft, the oblique counter-shaft, and the binding-arm connected with and moved by said oblique counter-shaft.

11. The combination, substantially as before set forth, of a binding-arm, the packer, and a rotating segmental cut-off which checks the flow of the grain to the packer.

12. The combination, substantially as before set forth, of a binding-arm, the independent cut-off for checking the flow of the grain to the packer, and a cord-tucking device attached to said cut-off.

13. The combination, substantially as before set forth, of the platform-carrier, the endwise butter, the roller for stripping the grain from said platform-carrier, the butt-hastening rake, and the packers.

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

PLINY F. HODGES.

Witnesses:

C. A. NEALE,

E. T. WALKER.