(No Model.) 4 Sheets—Sheet 1.

S. D. LOCKE.

GRAIN BINDER.

No. 304,536. Patented Sept. 2, 1884.

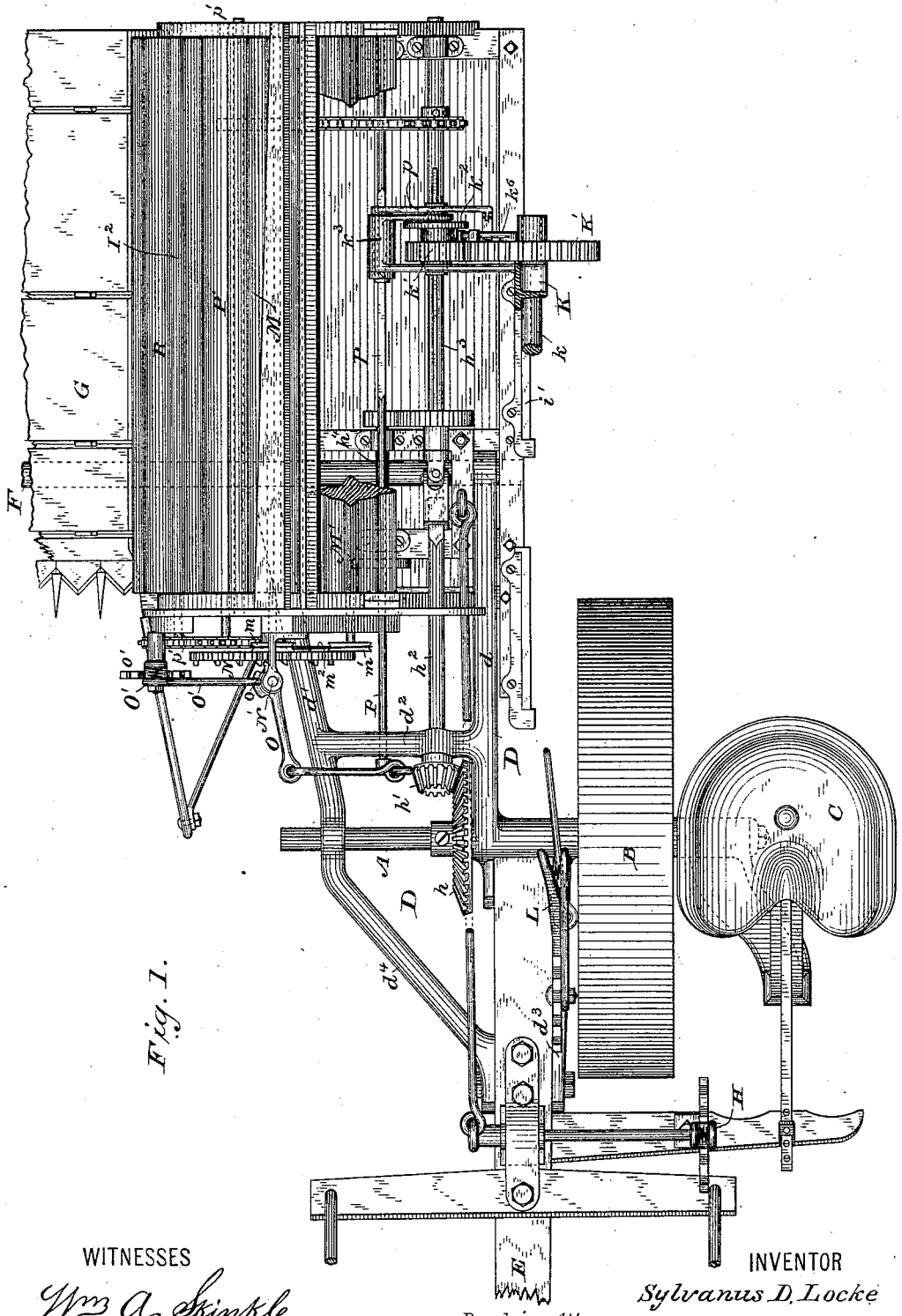

Fig. 1.

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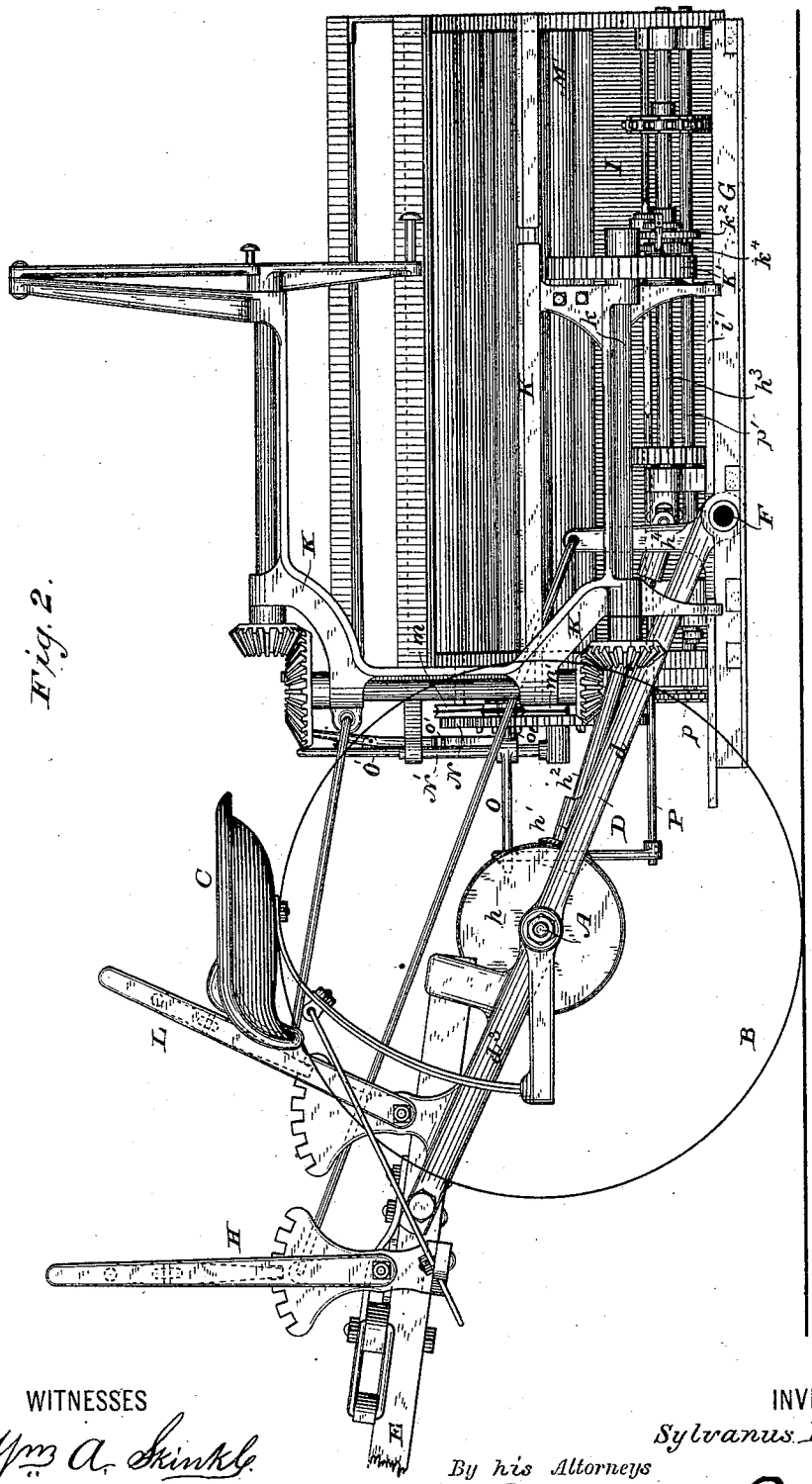
No. 304,536. Patented Sept. 2, 1884.

Fig. 2.



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(No Model.) 4 Sheets—Sheet 3.

S. D. LOCKE.

GRAIN BINDER.

No. 304,536. Patented Sept. 2, 1884.

Fig. 4

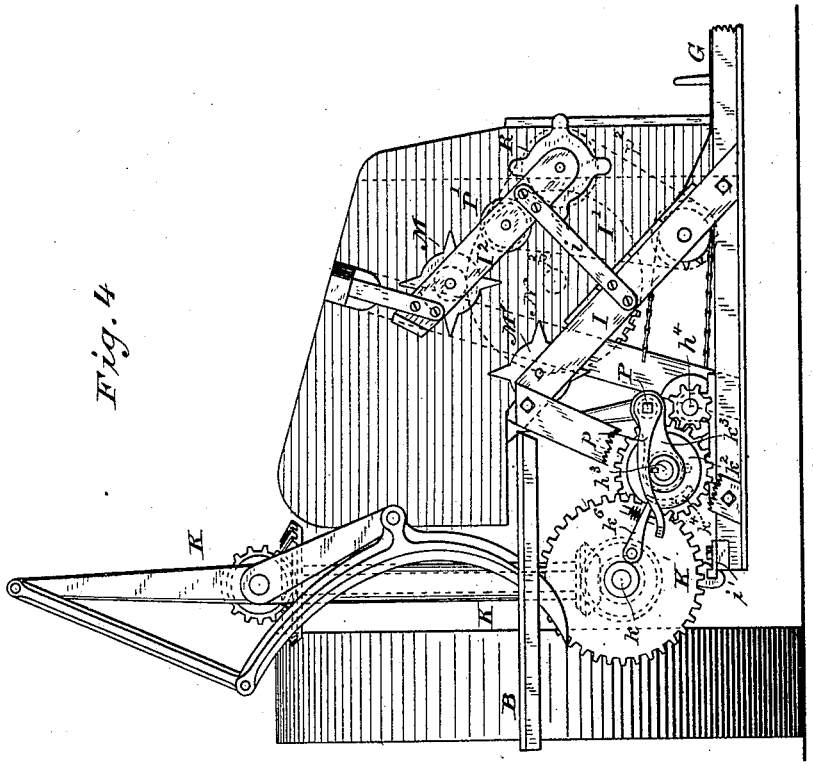
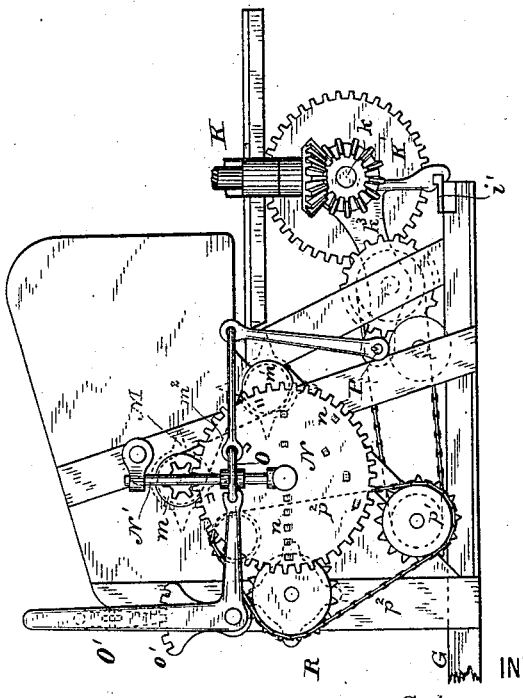


Fig. 3.



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S. D. LOCKE.

GRAIN BINDER.

No. 304,536. Patented Sept. 2, 1884.

Fig. 7.

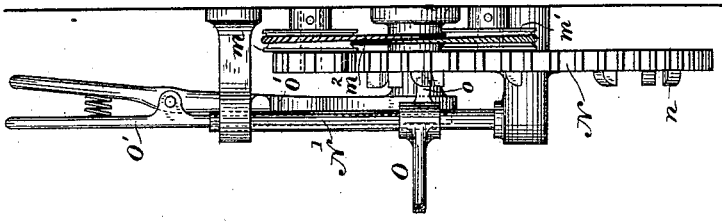


Fig. 6.

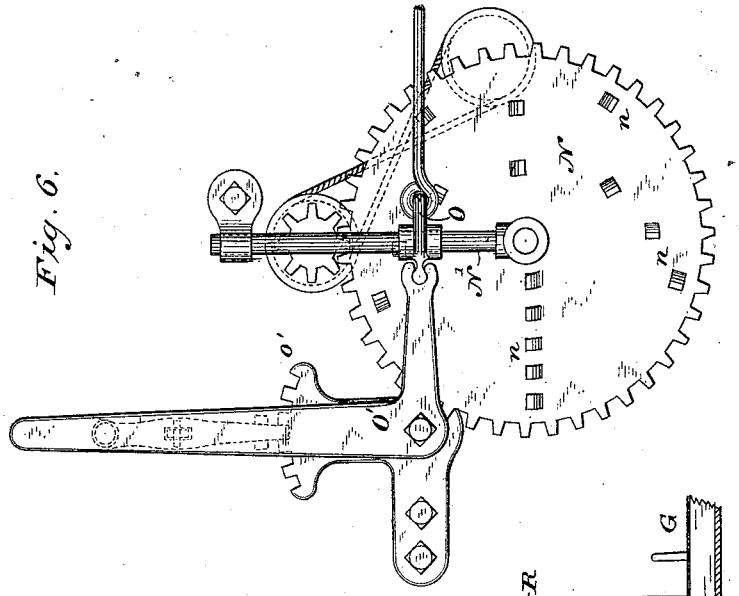
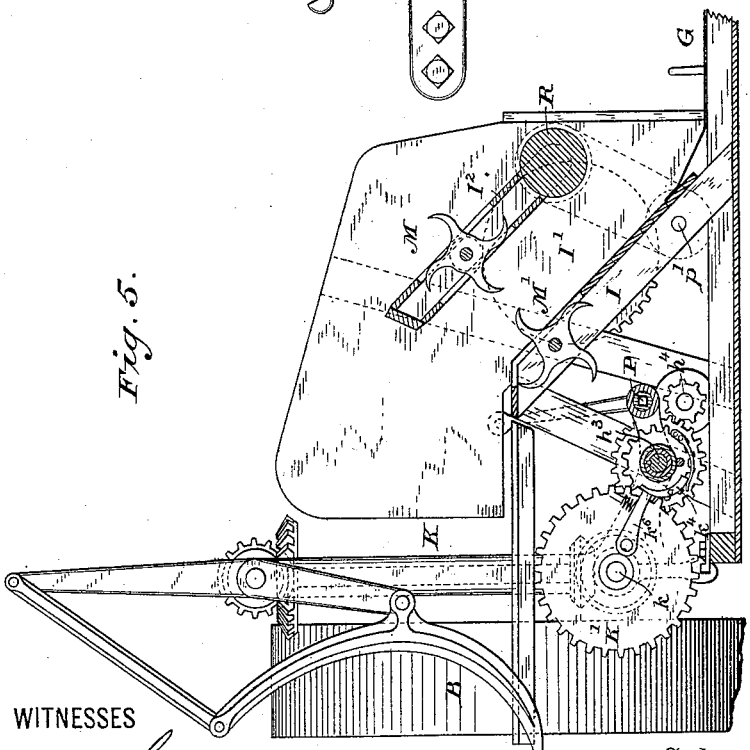


Fig. 5.



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UNITED STATES PATENT OFFICE.

SYLVANUS D. LOCKE, OF HOOSICK FALLS, NEW YORK.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 304,536, dated September 2, 1884.

Application filed April 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, SYLVANUS D. LOCKE, of Hoosick Falls, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Grain-Binders, of which the following is a specification.

The invention relates in part to novel tripping mechanism operated by the grain as it is fed or forced by rakes to or toward the binding-receptacle, and in part to an improved organization of harvester and binder; and it consists in combining with raking or packing devices which force the stream of grain toward the binding-table, a current wheel or wheels revolved by the force or pressure of said stream, a gear wheel or pulley driven by said wheel or wheels, one or more tappets on the face of said gear or pulley, a trip-lever operated by such tappet in its revolution, and connections between said lever and the tripping-clutch; in combining with raking or packing devices which force the stream of grain toward the binding-table, a packing-chamber or passage-way into which it is delivered by said devices, a current wheel or wheels located at or near the exit from said passage-way and revolved by the force of pressure of the stream as it travels therethrough, a gear or pulley driven by said wheel or wheels, one or more tappets on said gear or pulley, a trip-lever operated by such tappet in its revolution, and connections between said lever and the tripping-clutch; in combining with raking or packing devices which force the stream of grain toward the binding-table, a packing-chamber or passage-way into which the grain is urged by said devices, a revolving feed wheel or surface constituting a portion of one side of said passage-way and aiding the stream in its movement, a current wheel or wheels revolved by the force or pressure of said stream, a gear or pulley driven by said wheel or wheels, one or more tappets on said gear or pulley, a trip-lever operated by the tappet in its revolution, and connections between said lever and the tripping-clutch; in combining with raking or packing devices which force the stream of grain toward the binding-table, an ascending packing-chamber or passage-way into which such stream is urged by such raking devices, and a feed-wheel forming the lower portion of the upper side of said passage-way, and positively driven to aid the grain in its movement; in combining with raking or packing devices which force the stream of grain toward the binding-table, an ascending passage-way or chamber into which the stream is urged by such devices, a current wheel or wheels at or near the exit from said passage-way, revolved by the force or pressure of the stream passing therethrough, and tripping mechanism set in motion by said wheel or wheels as they are continuously revolved by the stream; in combining with raking or packing devices which force the stream of grain toward the binding-table an ascending packing-chamber or passage-way, into the lower end of which they urge the grain, current-wheels located at the upper and lower side of said passage-way and so connected as to unite their power, and tripping mechanism to start the binder, operated by said current-wheels as they are revolved by the force or pressure of the stream as it moves through; in combining with a harvester-platform, raking devices traveling lengthwise thereof and adapted to move the grain positively forward, an ascending packing-chamber or passage-way at the inner or stubble end of said platform, into which the raking devices urge the stream, current-wheels actuated by the stream as it passes through said chamber, and tripping mechanism operated by said current-wheels as they revolve; in combining, with a harvester-platform, raking devices traveling lengthwise thereof, an ascending packing-chamber or passage-way at the inner or stubble end of said platform, into which the raking devices urge and pack the stream, a current wheel or wheels at the upper or exit end of said passage-way, turned by the stream as it emerges therefrom, tripping devices actuated by said current wheel or wheels, and a binding-receptacle and automatic binding mechanism receiving said stream from the current-wheels; in combining with a harvester-platform, raking devices traversing lengthwise thereof, an ascending packing-chamber or

passage-way at the inner or stubble end of said platform, a driven feed-roller at the foot of said chamber, to assist the stream of grain urged therein by the raking devices in its ascent through the passage-way, a current wheel or wheels at the upper or exit end of the passage-way, turned by the stream as it passes through or emerges therefrom, tripping devices actuated by said wheel or wheels, and automatic binding mechanism to which the grain is delivered from said wheels; in combining with primary mechanism directly actuated by the pressure of the grain thereon to yield before said grain, and with the tripping-clutch, an intermediate speed device controllable at will and actuated from the first-named yielding mechanism, whereby the clutch may be engaged or disengaged a variable number of times to a uniform movement of the primary yielding device; in combining with a current wheel or wheels revolved by the stream of grain in its passage, a disk or gear-wheel driven by the revolution of said current wheel or wheels, concentric series of tappets varying in number upon the face of said disk, a pivoted trip-lever so connected as to operate the trip-latch or shipper, and means whereby said lever may be moved into the path of any given series of tappets, that it may be actuated a greater or less number of times to the revolution of the disk; in combining with two current-wheels, between which the stream of grain is urged to revolve them, a cross-belt connecting pulleys on the shaft of each current-wheel, a pinion on the end of the shaft of one of the current-wheels, a gear-wheel with which said pinion engages, concentric series of tappets arranged on the face of said gear-wheel, increasing in number from the inner to the outer series, a trip-lever so connected as to operate the trip-latch or shipper, and means whereby said lever may be moved upon its pivot to bring its power-arm into the path of any given series of tappets to start the binders a greater or less number of times to the revolution of the gear-wheel; in combining with the main axle and a single carrying-wheel mounted thereon, a seat-support from the outer or stubble end of said main axle, a main frame sleeved to said axle, prolonged inside of the carrying-wheel, a grain-wheel-supporting rock-shaft journaled in the ends of rearwardly-extending arms or bars of said main frame, a grain-platform and low elevator-frame journaled on said rock-shaft and raised or lowered as the shaft is oscillated by controllable connections with the main frame, a binding-table and automatic binding mechanism mounted upon ways along the outer side of the elevator-frame, a lever upon the main frame, and a link-connection between said lever and the binder, whereby it may be adjusted back and forth alongside of the elevator; and in the various other combinations and details of construction, hereinafter pointed out and claimed.

In the drawings, Figure 1 is a top plan view of a harvester and binding mechanism embodying my invention, with the grain end of the platform broken away or removed; Fig. 2, an elevation from the stubble side; Fig. 3, a front elevation showing the tripping mechanism driven by the current-wheels; Fig. 4, a rear elevation to further illustrate this tripping mechanism, and showing the packing-chamber, feed-wheel, and current-wheels; Fig. 5, a view similar to Fig. 4, (except that it is in longitudinal section,) showing modified forms of feed and current wheels; Figs. 6 and 7, front and side elevations, in detail and enlarged, of the variable tripping instrumentalities actuated by the current-wheels.

Certain portions of my invention—such as the tripping mechanism, the current-wheels and packing-chamber in their particular relations, and the feed-roller to such packing-chamber, the variable-speed device to actuate the clutch less or more frequently to a given uniform movement of the current-wheels, or other yielding device operated by the stream of grain—are capable of general application to harvesters of differing types; but as to the general organization of the machine as a whole, that which is now to be described is the one I prefer and consider novel with myself. In this organization I make use of the single-wheel harvester invented by me and made the subject of Letters Patent No. 295,777, granted to me on the 25th day of March, 1884; but the instrumentalities looking to the preparation of the grain for binding and the actual application of the band thereto are not shown or described therein, nor is their arrangement with reference to the parts of the harvester.

A is the main axle; B, the main wheel mounted thereon; C, the seat supported from a sleeve on the outer or stubble end of the axle and braced from a foot-rest or from the draft-tongue.

D is the main frame described in said application, sleeved to the prolonged inner end of the axle, and having rearwardly-extending arms or bars d d', united by a cross-piece, d^2, and also forwardly-extending arms or bars d^3 and d^4, in which the draft-tongue E is pivoted in advance of the axle, with its heel end extending toward said axle and playing between vertical guides to restrain it from lateral movement while permitting its vibration in a vertical plane, as it is let out or drawn in by the adjusting devices.

F is the rock-shaft, journaled in bearings in the ends of the rear frame-bars, and intended to support the grain-wheel by a crank-arm at its outer end, and to have a lever-connection at its inner end with the adjusting devices upon the main frame, whereby it can be oscillated; and G is the platform, journaled on said rock-shaft and raised or lowered as the shaft is oscillated; H, the tipping-lever, having a link-connection with an elevated portion of the frame fixed to said platform; h, the main gear upon the axle; h', the prime pinion

driven thereby, pinned or keyed to the telescoping shaft h^2, extending backward to the end of the rear frame-bars; h^3, the main shaft turning in bearings in longitudinal sills of the platform-frame, and connected with the telescoping prime-pinion shaft by a universal joint above the supporting rock-shaft of the platform; and h^4, a cutter crank-shaft driven by said main shaft, all these being as more fully and particularly described in the application above referred to upon said harvester.

The raking mechanism may be that described by me in an application filed by me on the 3d day of April, 1883, Serial No. 90,505—that is, consisting of a series of bands or belts arranged upon vertical drums at the inner and outer end of the platform, and carrying angular teeth which swing or fold in a vertical plane parallel with the face of the belt, and are held erect in their raking traverse by guides or trackways beneath the longitudinal slots in the apron through which they are projected; or it may be any other suitable raking appliance calculated to feed the grain steadily and positively forward and deliver it in a stream or in an approximately constant quantity, wisp by wisp, at the inner or stubble end of the platform proper. At this end is arranged a low elevator-frame, I, having above it a packing-chamber or passage-way, I′, formed by its own flooring or decking and by a covering-frame, I^2, overhung from the front of the machine, as will be understood from the subsequent description. This elevator-frame, in the present general organization, is to be distinguished from the elevator of the "Marsh" harvester, which is primarily for the purpose of bridging the main wheel, and must be of sufficient height to serve its object, while herein the main wheel is not beneath but in advance of the elevator, which need not and, as a rule, will not rise to the height of said wheel.

It is not strictly necessary that there should be an elevator-frame causing the packing-chamber to be inclined in an ascending direction, for it may be horizontal, or practically so, with its flooring a substantial continuation of the flooring or apron of the platform, so far as the binding and other special mechanism used in connection therewith is concerned.

It is, however, more beneficial to have the passage-way inclined, whether by the employment of the particular elevator described or of some other, since such inclination assists in packing and straightening or shaping the grain delivered therein and urged therethrough by the platform-rakes which reach its base. The covering-frame, as just stated, is overhung from the front, leaving an open throat at the rear, as in other machines heretofore built by me, to permit the heads of long grain to project; but as it is intended to receive and support operative mechanism, and will be much heavier than an ordinary float, it may therefore be found advisable to brace it at the rear from the struts of the elevator-frame by means of a metal bridge or yoke-shaped strap, i, which in practice will be bent outward sufficiently to permit the passage of any length of grain.

On ways i' along the end sill or girt at the stubble side of the machine, and along the elevator-frame, is placed a sliding binder-frame, K, of any approved and suitable construction. Herein, for illustration and because I consider it well adapted to the other instrumentalities and to the organization set forth, it is of the type heretofore patented and frequently improved upon by me, and now in quite extensive use—that is, it has upon a lower horizontal shaft, k, a gear and cam wheel, K′, which drives knotting, holding, and cutting mechanism or wire-twisting devices, and which itself is driven by means of a sliding or lantern wheel, k', on the constantly-rotating main shaft mounted in the platform-sills. A single bracket-casting, comprising a vertical front post, an overhung upper arm, and a subtending arm, affords, by said subtending arm, feet which rest upon the ways on the cross-girt, and also supports for the decking or binding table, and bearings for the lower shaft pinned to the gear and cam wheel, and in the vertical post receives a second shaft driven from the first by beveled gearing, while in the upper overhung arm the binder-arm shaft finds its bearings and is driven intermittently by mutilated beveled gears from the vertical shaft in the post. A link attached to this post and connecting it with a lever, L, at any suitable point upon the main frame or draft-tongue, preferably the latter, enables the driver to adjust this binder-frame back and forth according to the nature of the crop.

Heretofore the pinion k', driving the gear and cam wheel, has usually been secured to the shaft by a spline and groove, so that it would revolve constantly therewith. It is herein mounted loosely thereon, and only clutched intermittently thereto, as determined by tripping agencies operated by the stream of grain.

The clutch may be any one of the numerous devices suitable for that purpose already known. The special form which I have constructed is as follows: Alongside the sliding pinion a disk, k^2, is mounted upon the shaft, and keyed thereto by a spline and feather, permitting it to slide with the pinion. A yoke, k^3, embraces the two and causes them to move together and retain a fixed relation. Upon the pinion is pivoted a spring-pressed dog, k^4, having a spur or tooth projecting in toward the side of the disk, and upon the disk is a shoulder or driving-pin, which blocks the path of the spur on the point of the dog when the latter is closed into its normal position by its spring. A trip-latch, k^6, is pivoted to the face of the gear and cam wheel meshing with said pinion, and is supported by a shoulder thereon, so as to be carried positively there-

with in the direction of rotation, but on the other side is braced against this shoulder by a spring which yields, so that the latch may be lifted or moved away from the shoulder in the direction of rotation. Supposing the pinion to be clutched to the shaft and to be driving the gear and cam wheel, the trip-latch will, as said wheel terminates its revolution, be brought against the heel of the clutch-dog and will swing said dog on its pivot against the stress of its spring, opening it away from the driving-pinion on the disk and disengaging the pinion from the main shaft, when both pinion and wheel will come to rest, with the trip-latch holding the dog out of engagement, and the binder will stop. If, however, the trip-latch is lifted against its spring, it will be disengaged from the heel of the dog, which will thereupon immediately spring into the path of the pin on the driving-disk, and the binder will be again started. In the ensuing movement the trip-latch will be carried around by the gear and cam wheel in a second revolution, until it a second time strikes the heel of said dog and unclutches the pinion, stopping the binder, as before, and so on. The mechanism whereby this disengagement of the trip-latch from the dog is effected will next be described.

In the covering-frame of the packing-chamber, and at or near the top or discharge side of said chamber, is mounted a current-wheel, M, having teeth which project below the under decking of the frame through slots therein, and into the path of the grain moving in a compressed state through said chamber, so that the wheel will be revolved thereby. The teeth may be either straight, as in Fig. 4, or curved against the approach of the stream, as in Fig. 5, the latter being preferable; or they may, though not with as good effect, be long ribs extending lengthwise of the roller. Opposite this current-wheel, and with its teeth projecting up through slots in the lower or floor decking of the packing-chamber, is a second current-wheel, M′. At the front of the machine the shafts or gudgeons of these wheels receive pulleys m and m', respectively, which are connected by a cross-belt, m^2, so that as the wheels are turned by the stream passing through they may keep pace with each other, and the impulse to one assist the other, equalizing their movement and uniting the power of both for transmission to the instrumentality which they are to drive. A pinion on the shaft of the upper current-wheel meshes with a gear-wheel or disk, N, beneath. Upon this disk are tappets n, arranged at increasing distances from its axis. At the first reach from the axis there is or may be but a single tappet; at the second reach there will be two equidistant tappets, at the third reach three, also equidistant, and so on up to any desirable number.

Upon the pivot rod or post N′, supported in a bracket from the frame-work above the tappet-disk, and itself at its other end sleeved to or affording a bearing for the outer end of the spindle upon which said disk revolves, is mounted a trip-lever, O, in such manner that it may slide or be moved longitudinally of the rod, to bring its power-arm o at any given reach from the axis of the disk and into the path of the tappet or tappets at that reach. For this purpose it is linked to an arm from a lever, O′, which latches into a rack, o', on the frame, having its teeth and interdental spaces arranged with reference to the different reaches of the tappet.

From the weight-arm of the trip-lever a link connects with an arm from a rock-shaft, P, running beneath the elevator-frame or journaled in bearings in longitudinal sills of the platform-frame alongside of and parallel with the main shaft therein, and passing through the yoke which confines the driving-pinion and its clutch to the binder. Within this yoke, or connected therewith so as to partake of its movement, the rock-shaft receives a lifting-arm, p, which either bridges or passes beneath the main shaft, and at its free end is bent to bring it underneath the trip-latch. This latch will therefore be lifted whenever the trip-lever is struck and moved upon its pivot by a tappet upon the disk; and as this disk will receive a single revolution to a practically constant number of revolutions of the current-wheels acted upon by the stream of grain, it will be within the power of the attendant to determine, by shifting the trip-lever from one series of tappets to another on the face of the disk, the number of times that the binder will be actuated to such revolutions, and consequently the number of sheaves there will be bound. Obviously a single current-wheel may be used to effect the purpose, placed either beneath the lower decking or flooring or in the covering-frame, and at any point along the packing-chamber. The arrangement described has, however, many advantages in its favor. It is evident, also, that a wheel or disk with but a single tappet actuated by said current wheel or wheels may be employed to vibrate the trip-lever, but not to the best effect, and it is immaterial which of the current-wheels directly engages with or drives the disk.

In the preferred form of the machine using either the raking apparatus of my invention, to which reference has already been made, or other analogous thereto, the flooring of the packing-chamber is a practical continuation of the platform-decking, whether said chamber is horizontal or ascending, and the rakes, after delivering the grain at the entrance of the chamber and pushing it therein, immediately pass beneath such flooring. The grain thus slides constantly upon an unbroken support from the moment it touches the platform until it reaches the binding-table.

In the packing-chamber it is not intended that there shall be any conveying mechanism, at least none traveling so fast as the platform-

rakes, with the exception below noted, the object being to allow the grain to retard and condense as it is forced therethrough, and, in case of an ascending chamber, to slip and settle back by its own weight, so as to straighten out and become better packed. The exception is that a feed-wheel, R, is placed at the foot or inner end of the overhung covering-frame, so as to constitute the upper lip of the entrance to the packing-chamber, this upper lip to present a stationary surface. The grain, unsupported by the raking-fingers at that point, would be checked and tend to turn or curl over and roll back upon the platform. With the feed-wheel, however, which is positively driven at a peripheral speed equal to or slightly greater than the speed of the raking-teeth by means of a belt, p^2, or gearing from the shaft p'—the same shaft which drives the raking-belts in my said apparatus—or from other suitable source, all such tendency is overcome and the grain carried cleanly into the chamber, through which it must travel, pressed on by the accumulations behind it.

In Fig. 4 the feed-wheel is represented as formed with teeth or longitudinal ribs. When thus constructed, it will be advisable to place beyond and alongside of it a smooth-surfaced stripper-roll, P', driven at a slightly greater peripheral speed by the same belt, p^2, carried from the pulley of the feed-roll directly over its own reduced pulley. Beyond this the breast presented by the covering-frame will be imperforate, except where the teeth of the current-wheel or said wheel itself project through. Instead of the toothed feed-wheel, however, the smooth-surfaced wheel shown in Fig. 5 and driven in the same manner is preferably used. This acts well, requires no stripper, and allows a longer section of the breast to remain intact, giving the grain better opportunity to settle and regulate itself.

I claim—

1. The combination, substantially as hereinbefore set forth, of raking or packing devices which urge the grain toward the binding-table, a current-wheel revolved by the force or pressure of the stream of grain, a disk or gear-wheel driven by said current-wheel, a tappet on said disk, a trip-lever operated by such tappet in its revolution, and connections between said lever and the tripping-clutch, whereby the latter may be caused to engage by the movement of the lever.

2. The combination, substantially as hereinbefore set forth, of raking or packing devices which urge the grain toward the binding-table, a current-wheel revolved by the force or pressure of the stream of grain, a disk or gear-wheel driven by said current-wheel, tappets arranged singly and in series of varying numbers upon said disk on different lines, a trip-lever movable to bring its power-arm upon one or another of said lines, that it may be struck by the desired number of tappets in a single revolution of the wheel, and connecting instrumentalities whereby the tripping-clutch will be caused to engage by the vibration of the lever.

3. The combination, substantially as hereinbefore set forth, of raking or packing devices which urge the grain toward the binding-table, a current-wheel revolved by the force or pressure of the stream of grain, a disk or gear-wheel driven by said current-wheel, a tappet upon the face of said disk, a trip-lever vibrating upon a pivot parallel with the disk, and having its power-arm projecting into the path of the tappet, and a link connecting the other arm of the lever with instrumentalities for causing the engagement of the tripping-clutch.

4. The combination, substantially as hereinbefore set forth, of raking or packing devices which urge the grain toward the binding-table, a current-wheel turned by the stream of grain as it passes, a tripping-clutch between harvester and binder, and a speed device controllable at will intermediate between the current-wheel and the clutch, and driven by the former, whereby the clutch may be engaged and disengaged a variable number of times to a uniform number of rotations of the current-wheel.

5. The combination, substantially as hereinbefore set forth, of raking or packing devices which urge the grain toward the binding-table, a current-wheel revolved by the force or pressure of the stream of grain, a disk or gear-wheel driven by said current-wheel, tappets arranged singly and in concentric series of varying numbers upon the face of said disk, a trip-lever sliding upon an elongated pivot parallel with said face, and having its power-arm projecting theretoward, means for controlling the position of said lever to bring its power-arm into the path of any one or more of said tappets, and a tripping-clutch started by said lever.

6. The combination, substantially as hereinbefore set forth, of raking or packing devices which urge the grain toward the binding-table, a current-wheel revolved by the force or pressure of the stream of grain, a disk or gear-wheel driven by said current-wheel, tappets arranged singly and in concentric series of varying numbers upon the face of said disk, a trip-lever sliding upon a pivot-rod parallel with said face, and having its power-arm projecting theretoward, a controlling-lever by which said trip-lever is shifted along its pivot, and a rack into which the controlling-lever latches to hold the trip-lever in the path of any given series of tappets, and instrumentalities operated by said trip-lever as it is vibrated to start the tripping-clutch.

7. The combination, substantially as hereinbefore set forth, of raking or packing devices which urge the grain toward the binding-table, two current-wheels between which the stream of grain passes, actuating them by its force or pressure, connections between said

current-wheels to unite their power, a gear-wheel or disk driven by one of said current-wheels, a tappet or tappets upon said disk, and a trip-lever and tripping instrumentalities operated by said tappet or tappets as the disk revolves.

8. The combination, substantially as hereinbefore set forth, of raking or packing devices which urge the grain toward the binding-table, two current-wheels between which the stream of grain passes, turning them by its force or pressure, a crossed belt connecting pulleys on the shafts or gudgeons of each to unite their power, a pinion on the shaft of one, a gear-wheel or disk driven by said pinion as the current-wheels revolve, a tappet or tappets upon said disk, and a trip-lever and tripping instrumentalities operated by said tappet or tappets in the revolution of the disk.

9. The combination, substantially as hereinbefore set forth, of raking or packing devices which urge the stream of grain toward the binding-table, a packing-chamber or passage-way formed by an upper and lower decking, into which way the grain is delivered by said devices, and wherein it is condensed, a current-wheel located at a point along the length of said passage-way, with its teeth projecting therein through one of the walls, that it shall be revolved by the force or pressure of the stream of grain constantly passing through, and tripping instrumentalities actuated by said current-wheel to start the clutch between harvester and binder.

10. The combination, substantially as hereinbefore set forth, of raking or packing devices which urge the grain toward the binding-table, a packing-chamber or passage-way into which it is delivered by said devices, and wherein it is condensed, a current-wheel located at a point along said passage-way, with its teeth projecting therein, that it shall be revolved by the force or pressure of the stream of grain passing through, a tappet-disk turned by said wheel, a trip-lever actuated by the tappet or tappets on said disk, and a tripping-clutch started by the vibration of the lever to engage the harvester with the binder.

11. The combination, substantially as hereinbefore set forth, of raking or packing devices urging the grain toward the binding-table, a packing-chamber or passage-way into which it is delivered by said devices, current-wheels, one above and the other below said passage-way, with their teeth projecting therein, so that they shall be revolved by the force of the stream of grain going through, connections between said wheels, whereby their power is united, a rotating tripping wheel or disk driven by one of said current-wheels, and a trip-lever and tripping instrumentalities actuated by said tripping-wheel.

12. The combination, substantially as hereinbefore set forth, of raking or packing devices urging the grain toward the binding-table, a packing-chamber or passage-way into which it is delivered by said devices, current-wheels, one above and the other below said passage-way, with their teeth projecting therein, so that they shall be revolved by the force of the stream of grain going through, a crossed belt connecting a pulley on the shaft of one with a pulley on the shaft of the other, to unite their power, a rotating tripping wheel or disk gearing with a pinion on the shaft of one of the current-wheels, and driven thereby, and a trip-lever and tripping instrumentalities actuated by said tripping-wheel.

13. The combination, substantially as hereinbefore set forth, of raking or packing devices urging the grain toward the binding-table, a packing-chamber or passage-way into which the grain is forced by said devices, a driven feed-wheel or moving surface constituting a portion of one side of said passage-way and aiding the stream of grain in its movement, a current wheel or wheels revolved by the force or pressure of said stream, a tripping wheel or pulley driven by the current-wheel, and a trip-lever and succeeding tripping instrumentalities actuated by said tripping-wheel as it revolves to start the binder's clutch.

14. The combination, substantially as hereinbefore set forth, of raking or packing devices which urge the grain toward the binding-table, an ascending packing-chamber or passage-way into the foot of which said stream of grain is delivered and packed by the raking devices, a feed-wheel forming the lower portion of the upper side of such passage-way and positively driven to aid the grain in its movement, a current wheel or wheels beyond said feed-wheel turned by the force of the passing stream of grain, and tripping mechanism operated by said current wheel or wheels.

15. The combination, substantially as hereinbefore set forth, of raking or packing devices which urge the stream of grain toward the binding-table, an ascending packing-chamber or passage-way into the lower end of which the grain is forced by such devices, a current-wheel above and another below said passage-way, with their teeth projecting through its decking on the respective sides, that they shall be revolved by the stream of grain as it moves through, a connection between said wheels to unite their power, and a tripping-wheel or tappet-disk driven by them and actuating the trip-lever and mediately the tripping-clutch.

16. The combination, substantially as hereinbefore set forth, of a harvester-platform, raking devices traveling lengthwise thereof and adapted to move the grain positively forward, an ascending packing-chamber or passage-way at the inner or stubble end of said platform, into which the raking devices force the stream of grain, a current wheel or wheels located along the length of and actuated by the stream as it passes through said chamber, and tripping mechanism operated by the cur-

rent wheel or wheels as they are continuously revolved.

17. The combination, substantially as hereinbefore set forth, of a harvester-platform, raking-teeth traveling lengthwise thereof from the divider end through slots in the apron or decking, an ascending packing-chamber or passage-way, the flooring of which is a continuation of the platform-decking, and into the base of which said raking-teeth discharge and force the grain, a driven feed-wheel forming a portion of the upper breast or decking of said passage-way, and a binding-table and automatic binding mechanism to which it delivers.

18. The combination, substantially as hereinbefore set forth, of a harvester-platform, raking-teeth rising from beneath and traveling lengthwise thereof from the divider end through slots in the apron or decking, an ascending packing-chamber or passage-way at the stubble end, the flooring of which is a practical continuation of the platform-decking, and into the base of which the raking-teeth crowd and pack the grain, a driven feed-wheel located at the extreme lower end of the covering-frame to said passage-way, and having a peripheral movement equal to or slightly exceeding the speed of the rake, and a binding-table and automatic binding mechanism to which the packing-chamber delivers at its upper end.

19. The combination, substantially as hereinbefore set forth, of a harvester-platform, raking-teeth rising from beneath and traveling lengthwise thereof through slots in the decking, an ascending passage-way at the stubble end, having its flooring continuous with the platform-decking, and into the base of which the raking-teeth crowd and pack the grain, a driven feed-wheel located at the extreme lower end of the covering-frame to said passage-way, a yielding trip or trip-governor located along the length of said passage-way, beyond and above the feed-wheel, and ultimately connected with the stopping and starting clutch, and a binding-table and automatic binding mechanism to which the packing-chamber delivers at its upper end.

20. The combination, substantially as hereinbefore set forth, of a harvester-platform, raking devices traveling lengthwise thereof, an ascending packing-chamber or passage-way at the inner or stubble end of said platform, into the base of which the raking devices crowd and pack the grain, a current wheel or wheels at or near the upper or exit end of said passage-way, turned by the stream as it emerges therefrom, automatic binding mechanism to which said wheels deliver, and tripping devices actuated by them as they revolve.

21. The combination, substantially as hereinbefore set forth, of a harvester-platform, raking devices traveling lengthwise thereof, an ascending packing-chamber or passage-way at the stubble end, into the base of which the raking devices crowd and pack the grain, a driven feed-wheel forming the upper lip at the base or entrance above the point at which the rakes deliver to said chamber, a current wheel or wheels at or near the upper exit end of the chamber, turned by the stream as it passes through a binding-receptacle, and automatic binding mechanism to which said wheels deliver, and tripping devices actuated by them as they revolve.

22. The combination, substantially as hereinbefore set forth, of the main axle and single carrying-wheel mounted thereon, the seat supported from the outer or stubble end of the axle, the main frame sleeved to the extended axle inside of the carrying-wheel, the grain-wheel-supporting rock-shaft journaled in the ends of the rearwardly-extending arms or bars of said main frame, a grain-platform and low elevator-frame journaled on said rock-shaft and raised or lowered as it is oscillated in its own bearings, a binding-table, and automatic binding mechanism mounted upon ways along the outer sides of the elevator-frame, a lever upon the main frame, and a link-connection between said lever and the binder, whereby it may be adjusted back and forth.

23. The combination, substantially as hereinbefore set forth, of the loose sliding pinion, the sliding disk turning with the shaft, the dog upon the pinion and driving-pin upon the disk, and the yoke whereby they are moved along the shaft and kept in proper relation to each other.

24. The combination, substantially as hereinbefore set forth, to form a tripping-clutch for binders, of the driving-pinion loose upon its shaft, the dog pivoted upon the pinion, the disk turning with the shaft and carrying a drive-pin to engage with said dog, the gear-wheel with which said pinion intermeshes, the trip-latch pivoted upon said wheel, and the shoulder supporting said latch.

25. The combination, substantially as hereinbefore set forth, to form a tripping-clutch for binders, of the driving-pinion loose upon its shaft, the dog pivoted upon the pinion, the disk turning with the shaft and carrying a drive-pin to engage with the dog, the gear-wheel with which said pinion intermeshes, the trip-latch pivoted upon said wheel, the shoulder supporting said latch, and the spring pressing the latch toward the shoulder.

26. The combination, substantially as hereinbefore set forth, of the loose driving-pinion, the disk turning with the shaft, the dog upon the pinion, and the drive-pin upon the disk, the gear-wheel intermeshing with the pinion, the trip-latch pivoted upon the gear-wheel, the shoulder holding said latch to its work, and the lifting arm or finger upon the rock-shaft, oscillated by the trip-lever to release the latch.

27. The combination, substantially as hereinbefore set forth, of the loose driving-pinion sliding upon its shaft, the disk also sliding

upon said shaft, but turning therewith, the dog upon the pinion, and the drive-pin upon the disk, the gear-wheel upon the sliding binder-frame intermeshing with the pinion, the trip-latch pivoted to said wheel, the shoulder holding it to its work, the yoke whereby pinion and disk are carried together along their shaft when the binder is adjusted, and the lifting arm or finger upon the tripping rock-shaft, also carried with pinion and disk by the agency of said yoke.

28. The combination, substantially as hereinbefore set forth, of raking or packing devices urging the grain before them, a packing-chamber into which they force it, a driven feed-roll forming the upper lip at the entrance to said passage-way, and having a peripheral speed calculated to assist the grain passing therein, and a rotary stripper-roll beyond and alongside said feed-roll.

29. A covering-frame supported from the front and overhanging the decking at the stubble end of the machine, to form a packing-chamber, having therein a driven feed-wheel and a rotary current-wheel, substantially as described.

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Witnesses:
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