

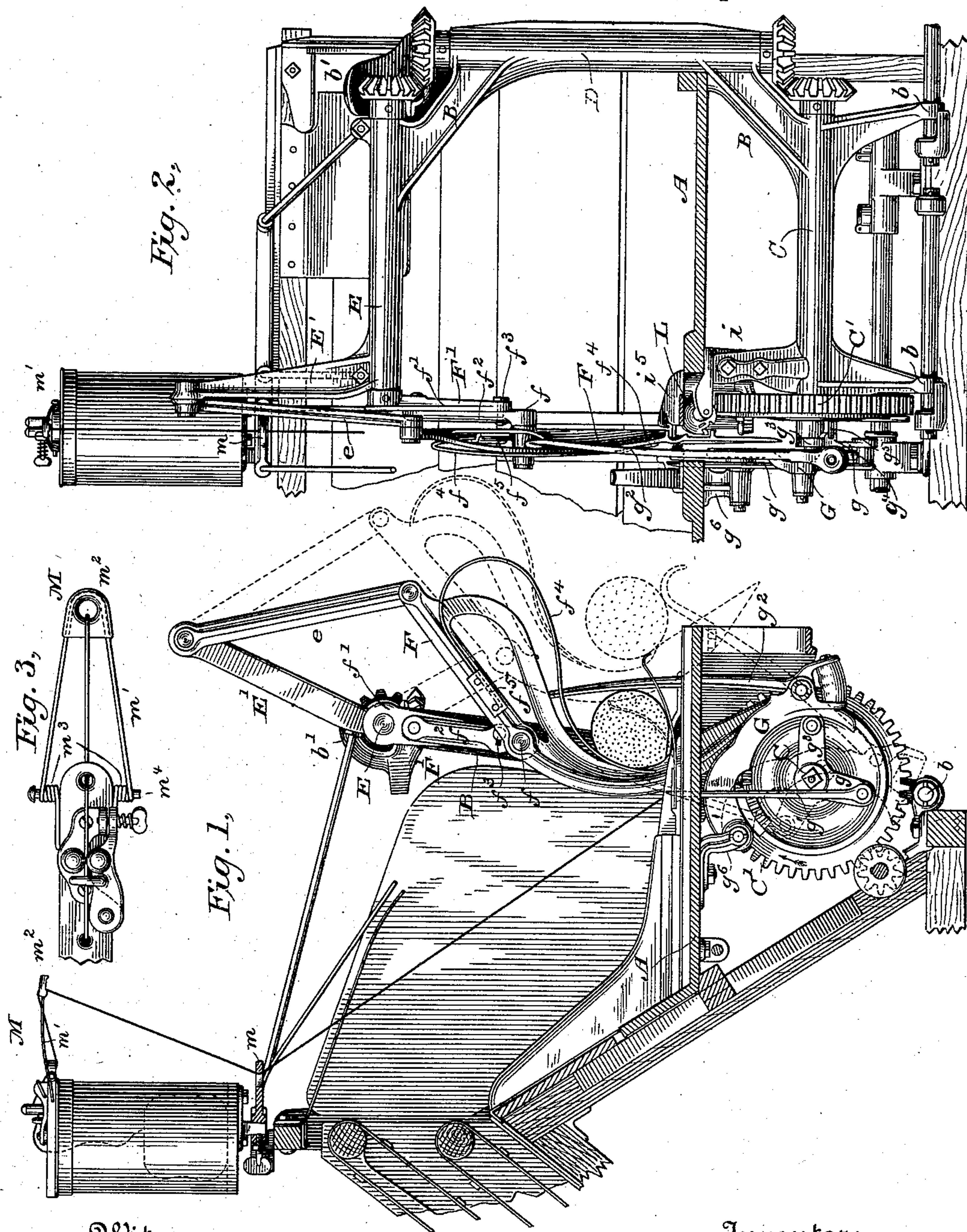
(Model.)

3 Sheets—Sheet 1.

S. D. LOCKE.
GRAIN BINDER.

No. 389,847.

Patented Sept. 18, 1888.



Witnesses:

Wm A. Skunk

Geo W. Buck

Inventor:

Sylvanus D. Locke,

by his Attorneys,

Pancison & Pancison

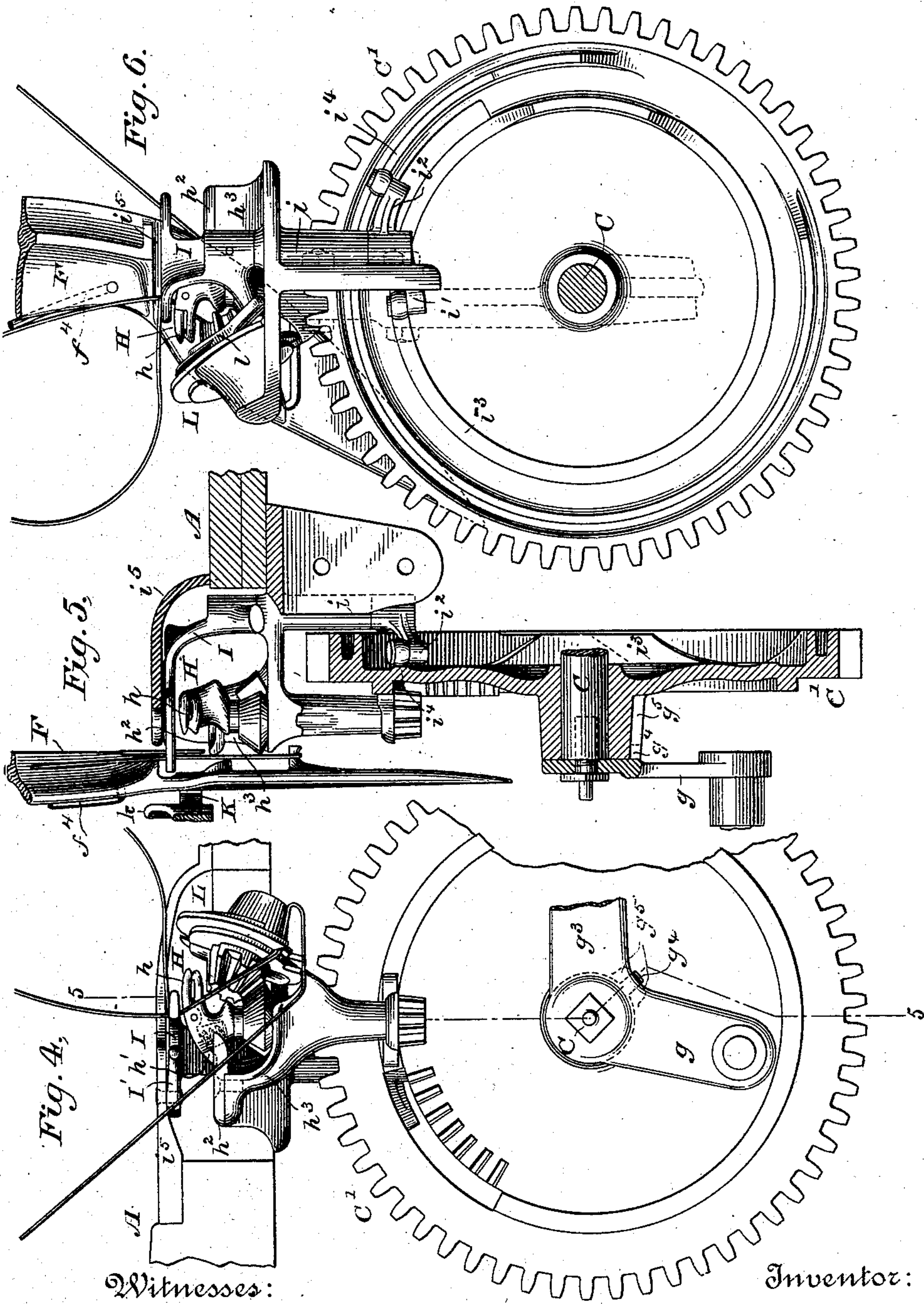
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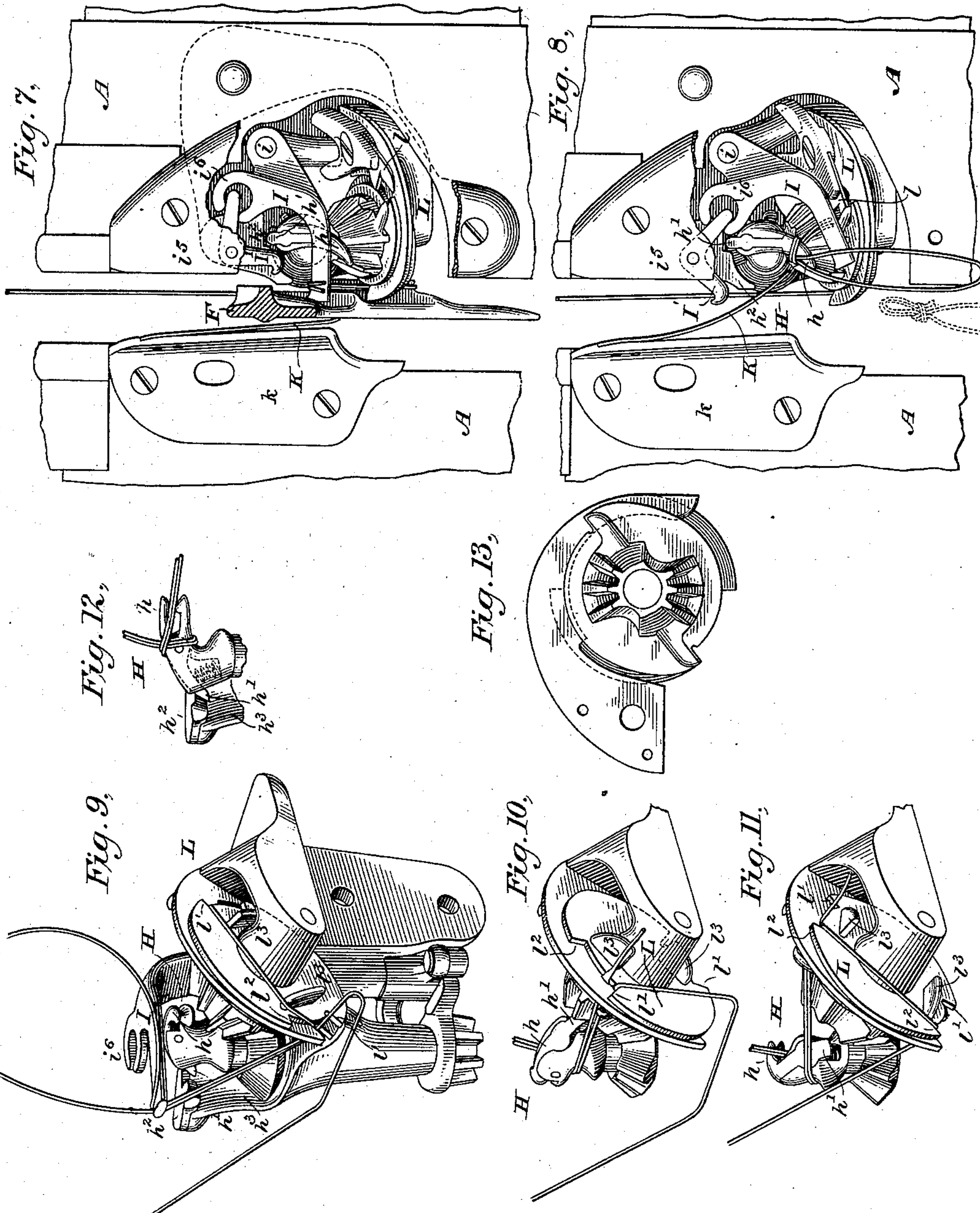
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UNITED STATES PATENT OFFICE

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

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 389,847, dated September 18, 1888.

Application filed April 17, 1883. Serial No. 92,021. (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.

On the 29th day of March, 1881, I made application for Letters Patent of the United States for an improvement in grain harvesting and binding machines, describing, among other things, an outside compressor-pin jointed to a swinging cam-plate and having an elastic seat thereon, a rotating crank having a wrist-pin lifting said cam-plate in its rotations, and a latch to hold the cam-plate in its uppermost position, and released by the wrist-pin as it came around to permit a temporary descent of the plate, whereby the compressor-arm was carried up into the path of the grain to stop it and oppose the sweep of the binding-arm, and then temporarily withdrawn at the conclusion of the binding operation to permit the discharge of the bound sheaf; a vibrating cord-gate actuated by anti-friction rolls upon oppositely-projecting arms of its pivot-spindle, and a trackway or trackways upon the face of a driven wheel on which these rollers traveled, whereby the cord-gate was swung out across the slot in the binding-table to stop the strands around the band and hold them in position for the knotting action, then swung back slowly to give up slack to the knotter, and finally opened away altogether to allow the loop to be stripped from the knotter, and immediately closed to stop the subsequent strands; a cord-holder composed of a holder-plate the point of which projected out and down into the space beneath the slot in the binding-table to receive the strand from the binder-arm and conduct it to the rotating clamping-disks operating in connection with such plate, and a boss upon the holder-plate immediately beyond the point at which its converging edge met the periphery of the disks, whereby the first strand of cord was stopped or retarded until the second strand was brought alongside thereof by the shoulders on the rotating disks, when both were pushed past said boss and carried on until firmly clamped.

The present invention relates, mainly, to improvements upon the foregoing features, but includes as well other improvements upon ma-

chines of the general type heretofore invented and constructed by me, and familiarly known to the public by my name, or else as the manufacture of the "Walter A. Wood Company;" and it consists in so constructing the swinging cam-plate or arm which carries the pivoted spring-seated compressor that the wrist-pin, by its contact therewith, will raise and retain it in position during the compressing and binding of the sheaf, and then by its departure will allow it to fall; in combining with the cord-gate which stops the ends of the strands around the gavel a secondary gate which stops the spool-cord and holds it out of the way until the main gate is again in position to receive it; in constructing one or both of the revolving holder disks with reversely-set shoulders which take the place of the boss on the holder-plate, which in the intervals of rest lie within the wedging throatway formed by said holder-plate and the periphery of the disks and prevent the first or old strand of cord belayed from the point where it is positively held over the lower disk and into the throatway between it and the holder-plate from slipping too far up between the two until the second strand is brought alongside thereof; in combining with the lower disk of the cord-holder, opposite its shoulders, rounded lugs or deflectors, which in turn lie opposite the throatway between the plate and disk as the disks come to rest, and serve to bend the belayed strand of cord into a favorable position to be drawn into said throatway and held yieldingly therein; in combining with the knotter and the binder-arm a yielding gate closing the slot in the binding-table and directing the strands in toward the tying-bill and cord-holder, but giving way elastically for the passage of the binding-arm; in casting the bracket-frame such as usual in my machines, supporting the two horizontal and connecting vertical shaft-sections with a hood, shielding and protecting the beveled gearing at the intersection of the upper or binder arm shaft and the vertical shaft in the front post; in providing the binder-arm with a facing-spring, so attached thereto as to have a compensating play; in a novel manner of mounting the take-up arm; and in the various other combinations and details of construction hereinafter pointed out and claimed.

In the drawings, Figure 1 is a rear elevation, partly in vertical section, of a binding attachment embodying the features of my invention; Fig. 2, an elevation from the stubble side with the rear end broken away and the binding-table in section to expose certain of the operative parts; Fig. 3, an enlarged detail of the take-up arm; Fig. 4, an elevation from the rear side of the gear and cam wheel, the knotter and holder driven thereby, and the primary and secondary cord-gates enlarged; Fig. 5, an elevation, on a similar scale, of the same parts looking from the stubble side of the machine, and with the gear and cam wheel in section and the binder-arm in position to deliver the cord; Fig. 6, a third elevation of said parts from the front side of the attachment; Figs. 7 and 8, top plan views of the cord-knotter or tying-bill, the primary and secondary gates, and the cord-holder in different stages of action; Fig. 9, a perspective view of the tying-bill, the primary or main gate in position to stop the cord, and the cord-holder at the moment it is to start, all mounted upon their supporting bracket; Figs. 10 and 11, the knotter and holder in successive stages of action; Fig. 12, a detail of the knotter, and Fig. 13 a plan of the holder.

A is the binding-table, and B the bracket-frame having a lower horizontal tubular arm subtending the binding-table and formed with feet *b*, which rest upon ways or guide-rods on the outer cross-girt to support the attachment therefrom, a vertical tubular post, usually located at the front of the attachment, and an upper horizontal tubular arm overhung from said post toward the center of the table.

Through the subtending arm passes the shaft C, having at its rear end the gear and cam wheel C' or main gear of the binder, and at its front end a beveled wheel or pinion meshing with a corresponding pinion on a second shaft, D, passing through the vertical post and having its bearings therein, which latter shaft engages by beveled gearing with the binder-arm shaft E, borne in the overhanging arm. Above the beveled gearing connecting the vertical shaft and binder-arm shaft a hood, *b'*, is formed integral with the bracket-casting, extending over and shielding said gearing, but permitting access to it from the front end. This hood, besides acting as a shield, strengthens and braces the overhanging arm from the post and better fits it to bear the weight of the mechanism at the rear end of the binder arm shaft.

From near the extreme end of the overhung arm—the end in air—rises a standard, E', to which is pivoted a link, *e*, the other end of said link being pin-jointed to the heel of the binder-arm F, in order to guide it. A crank, F', is pinned or keyed to the rear end of the shaft E, immediately beyond the end of the overhung arm, and its wrist-pin *f* enters a bearing in the binder-arm about midway of its length, so that the binder-arm, controlled at its heel end by the swinging link, may be given

an orbital movement as the crank revolves to gather and encircle the gavel. Formerly this crank has been made in a single piece, the wrist-pin being immovable with reference to its body. Therefore, whenever the binder-arm became out of adjustment—as by the twisting of the shafts or the wear of the gearing—so as to be defective in its action, however little, it had to be removed and brought again in proper adjustment, or else replaced by a new one. To avoid this necessity, I now construct the crank in two pieces, the first of which, *f'*, is rigid with the shaft and the second, *f''*, pivoted to the other near to the axis of movement, farther down being transversely slotted, and receiving in said slot a clamping bolt or screw, *f''*, which takes into the end of the first and may be relaxed to permit a relative lateral adjustment between the two sections, whereby the wrist pin, borne at the end of the second, may be carried in or out to bring the point of the binder arm into its proper position, and then tightened to hold the arm in the given adjustment.

The binder-arm itself is of the ordinary construction, but is bored transversely near its point just above the surface of the binding-table when the arm is down, and in this bore receives the bent end of a curved spring, *f''*, which sets out somewhat in advance of the arm itself and comes in active contact with the grain. The other end of the spring is recurved and its final straight portion brought alongside the heel-extension of the arm, where it is confined by a clip, *f''*, which allows it to play longitudinally of said extension to compensate for the bends or deflections caused by the resistance of the grain in the binding operation.

The rear end of the shaft C receives outside of the main gear a crank, *g*, which carries on its wrist-pin a divider-arm, *g'*, playing up and down through a guide-aperture in the binding-table or a casting attached thereto as the crank revolves. In the previous application referred to this crank was made to actuate, by means of its wrist-pin or a roller thereon, a hinged cam-plate, G, which bore at its outer end a pivoted and spring-seated compressor, *g''*; but the time for the movement of the cam-plate was at such variance with the time for the movement of the divider-arm that it was either necessary to provide a latch to hold the cam-plate in raised position after the crank had moved away from it, which was the course actually adopted, or else to make such cam-plate so large, extended, and heavy as to greatly lessen its desirability in the machine. This is now easily remedied by providing a second crank, *g''*, with its wrist-pin and roller following the first at sufficient distance behind to take up the labor of supporting the cam-plate at the moment or shortly before the first crank leaves it and hold it constant the proper length of time.

For efficiency and rapidity in the construction of the machine, and also because it en-

ables them to be made in fixed and permanent relation to each other, and to be substituted by others having the same identical shape and relation whenever broken, these two crank-arms are cast together as independent from the shaft, and are connected to said shaft and to the gear and cam wheel keyed thereto by means of lateral ears or lugs g^4 , projecting from their common hub toward the face of the wheel, and a feather, g^5 , on the hub of said wheel embraced by these ears or lugs. When the crank-arms are brought into place, a screw taking into the end of the shaft completes the fastening. This construction renders impossible any springing or displacement of cranks in relation to the shaft.

The cam-plate G also is changed in shape, its track being formed in two distinct sections or reaches, the first of which extends from the pivotal point in the bracket g^6 for a short distance, and is curved, as shown, so that the wrist-pins and their rollers shall raise the plate to its highest position while passing over it; and the second is described while the plate is in this highest position upon a curve concentric with the axis of the cranks supporting the wrist-pins in order that while the rollers are traveling over it the plate may remain stationary, with the compressor projected up through a slot in the binding-table to stop and compress the grain. As thus constructed, the first wrist-pin (the one supporting the divider-arm) as it strikes and traverses the initial section of the cam-track will raise it, and then passing upon the second section will retain it in this raised position, and the second wrist-pin following after will make its first contact with the second track, which will still be raised into its path by the foremost crank, and will not touch the initial or first section of the track at all. As long as either of the two wrist-pins is in contact with the second section, the cam-plate will be retained in its elevated position; but when the second or hindmost leaves it it will fall by its own weight or urged down by a spring, as deemed most efficient, and will retract the compressor, permitting the escape of the bound sheaf.

The knotter or tying-bill H, as in Letters Patent No. 249,248, granted to me on the 8th day of November, 1881, has the pivoted upper jaw, h , the cylindrical bore in the shank receiving a spring, and the cap upon said jaw behind its pivot, covering the bore and inclosing the spring therein to press upon the latter as a seat; but beyond this cap the heel end h' of the pivoted jaw is prolonged through a vertical slot in the body portion until it projects slightly, as shown in Fig. 12. A horizontal cam-plate, h^2 , is fixed to an arm, h^3 , rising from the supporting-bracket, so as to be struck by this projecting heel piece or tang at that point in its revolution when the ends of the band have been crossed to form the loop and are stretched alongside the two jaws ready to enter between them. This contact between the heel-extension and the cam causes the pivoted

jaw to be opened momentarily to receive the crossed ends, and immediately thereafter, as it passes out from beneath the cam, it is closed by the force of the spring in the cylindrical recess and clasps the ends, which are at once to be severed from the holder when the loop will be pulled or pushed off, closing upon them and completing the knot.

The cord-gate I as to its effective portion is of substantially the outline formerly adopted by me, and is or may be operated by the same means, to wit: the vertical pivot-spindle i , to which it is fast, supported in bearings in the bracket and having at its lower end two oppositely-extending arms, i^1 and i^2 , which bear rollers traveling, respectively, upon cam-tracks i^3 and i^4 on that face of the gear and cam wheel opposite the one bearing the segment and delay-ledge for operating the knotter, and, as they follow said cam-tracks, cause the gate to be first swung out across the slot in the binding-table to stop the old end of the strand and then the new end as it is brought around by the binder-arm before they have passed the knotter, so that they may be in position for its action; next permit it or force it to yield as the knotter is revolving, to give up slack and to bring the strands into such successive positions as will be most conducive to the perfect action of said knotter; then open it entirely away, that the knot now laid upon the jaws of the knotter may be pulled or forced therefrom and the bound sheaf ejected; and, finally, close it rapidly into its former position to stop the new strand leading from the holder to the spool before the accumulating grain behind it has pushed it out of place.

I have found that a single cord-gate, although filling its own office with acceptability, is not absolutely safe against the effects of outside pressure. It stops the two strands from the band about the gavel and will properly direct and yield these up; but it will sometimes happen that the strand leading from the binder-arm to the spool, and which in its turn is to be utilized for binding the next bundle, will prematurely come against the gate, or will be pressed thereagainst by the rapid accumulation of the incoming grain, and thus will be taken by the knotter or will obstruct its action; and where the binder-arm, as with mine, does not have the cord permanently running therethrough, but catches over it or receives it in a lateral flange as it is stretched directly between the holder and the cord box or spool, or between the holder and some guide-eye on its direct way to such cord box or spool, this strand from the spool is liable after being released by the binder-arm as the latter starts at the end of the knotting operation to be pressed forward by such accumulation so suddenly that it passes beyond the cord-gate in the brief interval during which the latter is open, and is thenceforth out of the range of the knotter. Therefore I supplement this cord-gate, hereinafter termed the "main" gate or "primary" gate, by a second gate, I', lying

within it in the direction in which the cord is brought toward the knotter, which secondary gate closes as the primary gate opens and stops the spool-strand, and opens when the primary gate closes to allow the spool-strand to pass on against said gate, where it will remain until the second strand is brought alongside of it. This secondary gate may be independently operated, preserving its proper sequence with the action of the main gate, and of course may be used with a main gate actuated by different means or in a somewhat different manner from the one described. When using it with the specific form of the latter, it is simplest and most convenient to pivot it by a pin to the underside of the cap plate i^5 , overlying and shielding the tying, holding, and cutting mechanism, and beyond this pivot to provide it with an arm or heel extension, which takes into a recess, i^6 , in an offset from the main gate, whereby the latter, when vibrated, will simultaneously vibrate the secondary gate, but in the reverse direction, throwing it across the slot in the binding-table as it itself opens and opening it away therefrom in its own closing movement. To further supplement the action of these gates, and especially of the main gate, and to more effectually prevent the cord from slipping past the latter as it is released by the secondary gate, a third gate, K, a leaf-spring, is secured to the guide-plate k on the opposite side of the slot in the binding-table from the cord-gates and knotter and is bent in and downward toward the base of the knotter, so as to bring it beneath the plane of the main gate and completely close the passage-way between the secondary gate and the main gate, that as the cord is released from the former it may be guided inward toward the latter and so certainly come against it. This spring-gate is sufficiently flexible to yield easily to the binder-arm as it passes, and will offer no obstruction thereto, but at the same time has strength enough to serve its purpose as a guide or deflector for the cord.

The holder L in arrangement, position, and general features resembles that described in my former application. It has the holder-plate, the two disks—one on each side of the plate—shoulders on such disks to force the cord along the plate clamping it, and secondary shoulders projecting from the mutilated pinion driven from the shank of the knotter, and it operates in connection with a cutter, l , striking in between the primary shoulders of that disk on the side toward the knotter and the secondary shoulders from the pinion to sever the cord. The cord is carried in the same direction, laid in the same manner, and held between the point of the holder-plate and the periphery of the disks, as in a secondary holder, besides the original holder at its end; but the boss upon the holder-plate, just beyond the point where its converging edge meets the periphery of the disks, has been found somewhat deficient in fulfilling its purpose and is now omitted, and instead the lower or center disk—the one on the

side farthest from the knotter—in addition to the shoulders l' , which force the cord forward in the rotation to carry it beneath the holder-plate and clamp it, is provided with reversely-set shoulders l'' a sufficient distance in advance of the others to bring them, or that one of them which happens at the moment to be approaching the slot in the binding-table, at about the same distance beyond the meeting-point of the holder-plate and disk-periphery as the boss was heretofore when the disk stopped, so that this shoulder will present a positive bar to the cord whenever it has slipped sufficiently beneath the point of the holder-plate as to come against it, and it will remain stopped by such shoulder until the holder-disks commence again to revolve, when the second strand will be brought up alongside of it. This construction may be used as supplemental to the former. The boss may be still employed, but relieved from its office as a stop to the cord in the interval between binding operations, and serving only to retard the first strand after the disks start, and the shoulder, which until that moment has stayed it, is carried away and until the second strand is brought up by the working-shoulders.

That the cord may wedge itself in between the holder-plate and the disks for a secondary grasp it is necessary that it should come to this point at an inclination and not be stretched flat from the primary hold at the extreme end across the face of the lower disk, and then bent suddenly at right angles into the throatway between the plate and disk. This was accomplished in the original construction by means of a pin projecting from the offset on the bracket-arm, which receives the spindle of the disks and their pinion. The cord, however, occasionally escapes or misses this pin, and then will fail to be properly caught and wedged into the throatway, and may therefore pull through at the moment its extreme end is released and before the shoulder has come up against it to force it beneath the plate; hence it is desirable to have such a guide as a substitute for the pin, that the proper bend or angle in the cord will always be insured. To obtain this end, ledges or cams l^3 are arranged upon the under side of the outer or bottom disk opposite the space between the reversely-set shoulders, with their round or deflecting edges in advance and reaching abreast of or slightly beyond the stop-shoulders. One of these—that one nearest the throatway—will always be in the direct line or path of the cord as it is stretched from its grasped end to such throatway, and thence up to the spool or cord-box, and will cause a bend or deflection in it, as in Fig. 9, such that it will easily and certainly wedge in between the holder-plate and disks until it strikes against and is stayed by the stop-shoulder.

The cord-box is similar to others in general use, and the tension device, as shown, resembles the one in the previous application referred to, being borne upon the top of the cord-

box and consisting of conico-cylindrical jaws mounted upon two plates, one of which is pivoted and adjustable toward the other under spring-pressure, these plates being in turn mounted upon a wooden bar secured diametrically of the cap or cover of the box and projecting slightly beyond it at that side toward the binding-arm where it has an eye to direct the cord. From this eye the cord previously ran direct to the end of a pivoted take-up arm and from that to the holder. I now propose that it shall run from the end of the take-up arm M through a second eye, *m*, near the base of the box, having proven that the yielding end of the take-up arm tends to disarrange the cord and spring it in a different position with reference to the binder-arm in each consecutive binding operation. With the fixed guide-eye between the take-up arm and the holder this disability is entirely obviated and the line of the cord from the holder will always be the same. It always stretches at precisely the same angle or inclination, and the binder-arm will always find it in the same position. The take-up arm also is of a novel construction and mounted in a novel manner. It is composed of a light bent wire spring, *m'*—such as indicated in Fig. 3—having at the bend or bight an eye, *m''*, of malleable metal, which receives the wire body in a rounded groove or channel in its under surface, and is clasped thereon by fingers or lugs turned down after it has been applied. From this eye the arms of the spring flare away, and at the proper distance therefrom have formed in them coils *m'''*, exactly opposite each other, which take over the ends of a bolt or rod, *m''''*, in the present instance passed through the wooden bar which supports the tension device, immediately behind the eye at the end of said bar, and serving to strengthen it. Beyond the coils the ends are straight and parallel for some distance, and are finally bent in at right angles and enter sockets in the sides of the bar or other support, completing the fastening. With my tension device this construction of the take-up is found very convenient and compact, enabling me to use a short arm and to apply it quickly and readily.

I do not confine the scope of my improvements as regards the cord-holder to one occupying the position and driven by the same means and combined with the same cutter as that herein shown, considering that they may be applied whenever two rotating disks act in conjunction with an interposed holder-plate beneath the edge of which the cord is carried. Nor do I limit myself to a leaf-spring alone to form the gate for permanently closing the slot in the binding-table, except when opened for the passage of the binder-arm. Other qualifications to the invention have been pointed out from time to time in the progress of the description.

I claim—

1. The combination, substantially as hereinbefore set forth, of the hinged cam-plate, its

track formed in two sections, one of which tends to raise it and the other to hold it stationary in its elevated position, the compressor-arm pivoted to said plate, and a revolving crank having a wrist-pin traveling upon said tracks in its revolution to raise the plate and hold it elevated, with the compressor projected above the binding-table.

2. The combination, substantially as hereinbefore set forth, of the hinged cam-plate formed with the trackway of the outline described, the two crank-arms and their wrist-pins arranged one in advance of the other, and each in succession coming in contact with the trackway, the second before the first has entirely passed off therefrom, and the compressor-arm pivoted to said cam-plate.

3. The combination, substantially as hereinbefore set forth, of the cam-plate hinged to a bracket beneath the binding-table, the compressor-arm carried at the free end of said cam-plate, the irregular trackway on the lower edge of the plate, the rotating crank having a divider-arm pivoted thereto, and the second crank behind the first, arranged in such manner that their wrist-pins, or the rollers thereon, in succession travel over the trackway to raise the cam-plate and compressor-arm and hold it raised during the proper interval.

4. The combination, substantially as hereinbefore set forth, of the main gear, the shaft to which it is keyed, and the double-crank piece cast integral and formed with lateral ears which embrace a flange on the hub of said wheel or gear to hold the crank-arms in fixed relation thereto.

5. The combination, substantially as hereinbefore set forth, of the bracket-frame, the shafts mounted therein, the bevel-gearing connecting said shafts, and the hood cast integral with the frame at the angle between the vertical post and upper overhung arm to shield the bevel-gearing at that point and brace the frame.

6. The combination, substantially as hereinbefore set forth, of a binder-arm guided or controlled at its heel end, a wrist-pin upon which it is mounted at a point along its length, a crank to which said wrist-pin is secured, and means for adjusting the wrist-pin transversely of the crank and holding it fixed in its adjustment.

7. The combination, substantially as hereinbefore set forth, of the binder-arm guided or controlled at its heel end, the revolving crank, the arm pivoted to said crank toward its axis of movement and transversely slotted near the end of the crank, the bolt passing through said slot and into the crank to clamp the arm thereto, and the wrist-pin from the extreme end of the arm taking into the binder-arm at a point along its length.

8. The combination, substantially as hereinbefore set forth, of the binder-arm, the link to which it is pivoted at its heel end, the rotating crank, the arm upon said crank pivoted thereto between its end and axis of motion,

the bolt passing from the end of the crank through a transverse slot in said arm to permit it to be adjusted and held in position, and the wrist-pin from the extreme end of the arm entering the binder-arm at a point along its length.

9. The combination, substantially as hereinbefore set forth, of the binder-arm and the elastic or spring arm set out from the face thereof and playing at one end in the keeper.

10. The combination, substantially as hereinbefore set forth, of the binder-arm and the elastic spring-arm connected thereto at a point toward the end or nose and set out in advance to come into contact with the grain, then bent and recurved, and the clip or keeper confining the returning straight end of said spring arm to the shank or heel end of the binder-arm with capacity of longitudinal play.

11. The combination, substantially as hereinbefore set forth, of a main gate to stop the strands of cord from the band about the gavel, and a secondary gate to stop the spool-strand.

12. The combination, substantially as hereinbefore set forth, of a main gate to stop the strands of cord from the band about the gavel, a secondary gate to stop the spool-strand, and means whereby the secondary gate is opened as the main gate closes and closed as the main gate opens.

13. The combination, substantially as hereinbefore set forth, of the vibrating main gate, the vibrating secondary gate, the heel-extension from the latter, and the recessed offset from the former receiving said heel-extension, whereby the movement of the main gate causes a movement of the secondary gate in the reverse sense that one may close as the other opens.

14. The combination, substantially as hereinbefore set forth, of the main gate, the spindle to which it is attached, the arms and rollers on said spindle, the cam-tracks on the face of the driven wheel, the secondary gate pivoted to the cap-plate and having a heel-extension, and the recessed offset from the main gate receiving said heel-extension.

15. The combination, substantially as hereinbefore set forth, of a binder-arm moving through and carrying the cord along a slot in the binding-table or decking, a cord-gate moving out across said slot to intercept and stop the strand or strands of cord, and a yielding gate from the opposite side of the slot arranged to direct said strands toward the cord-gate while yielding for the passage of the binder-arm.

16. The combination, substantially as hereinbefore set forth, of the main cord-gate, the secondary gate, and the yielding gate project-

ing across the slot in the binding table from the opposite side thereof, and entering between the main and secondary gate to direct the cord released by the latter into the grasp of the former.

17. The combination, substantially as hereinbefore set forth, with the knotter and the cord-gate, and with a binder-arm moving through and carrying the cord along a slot in the binding-table or decking, of the yielding gate formed of the plate-spring attached on the opposite side of the slot to said knotter and cord-gate, and projecting thereacross to guide the strand or strands of cord in toward the cord-gate.

18. The combination, substantially as hereinbefore set forth, of the holder-plate, and the intermediately-rotating holder-disks formed with shoulders to force the cord beneath and along the edge of the plate, and as to one of the disks with reversely-set shoulders which in the intervals of rest lie within the wedging-throatway formed by said holder-plate and the periphery of the disks to stop or stay the strand of cord stretched from the point where it is primarily grasped up to the spool or cord-box.

19. The combination, substantially as hereinbefore set forth, with the lower or outer holder-disk, of the cam-ledges formed thereon in such relation that one of them is opposite the throatway between the edge of the holder-plate and the periphery of the disk whenever said disk is stopped in its rotation.

20. The combination, substantially as hereinbefore set forth, with the holder-plate, of an intermittently-rotated disk on the side thereof away from the band-uniting mechanism, formed with reversely-set shoulders and with cam-ledges opposite the space between such shoulders to bend or deflect the cord as it is stretched from the grasped end through said throatway and up to the spool or source of supply.

21. The combination, substantially as hereinbefore set forth, of the tension device, its supporting-bar, the eye in the end of said bar, the bolt passed through said bar behind the eye, and the spring take-up bent as described and having coils in its two arms embracing said bolt, and beyond the coils straight extensions which finally bend inward and enter sockets in the bar.

22. The combination, with the spring take-up arm bent and formed as described, of the malleable eye-casting, embracing said take-up at the bight or bend of its arms.

SYLVANUS D. LOCKE.

Witnesses:

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