

(No Model.)

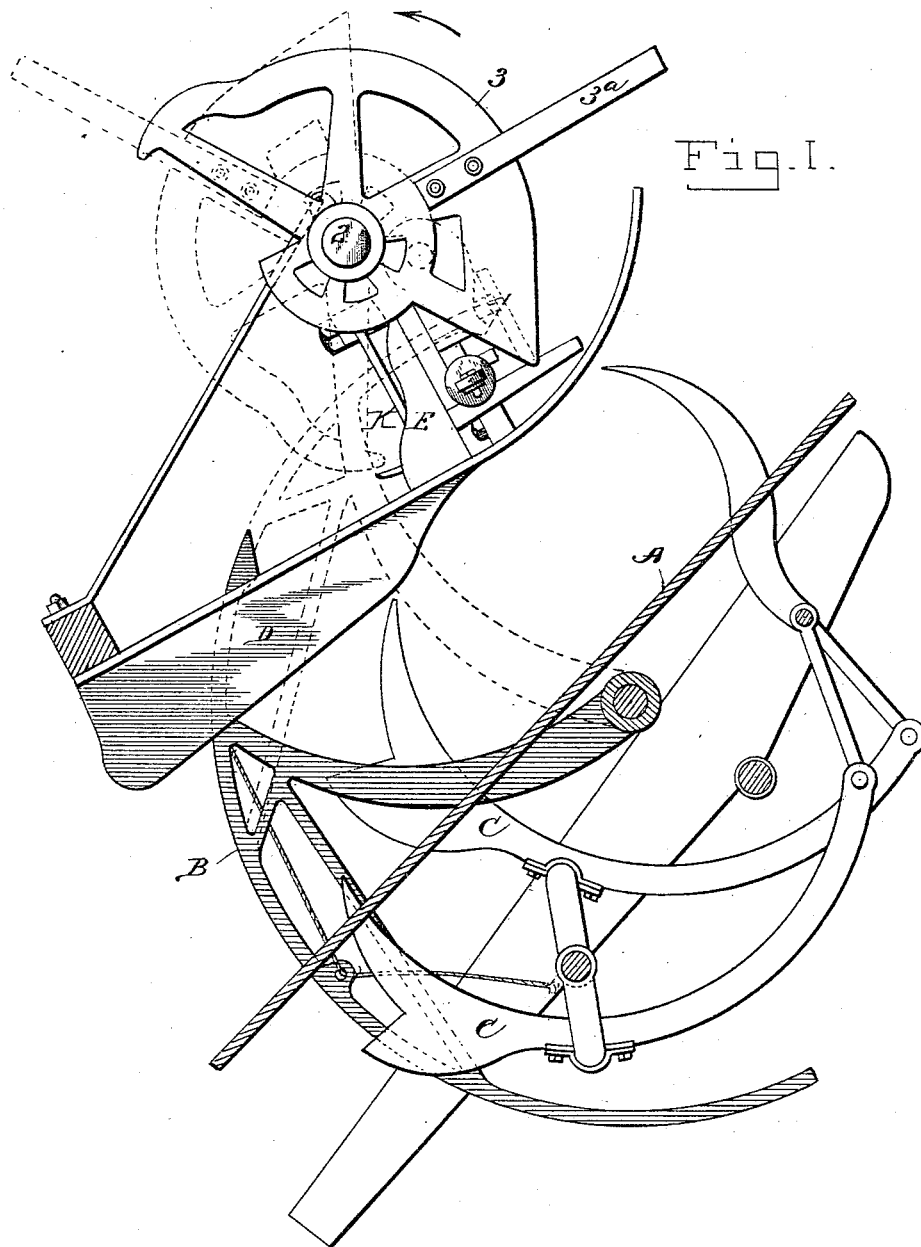
3 Sheets—Sheet 1.

A. B. LANG.

AUTOMATIC CORD GRIPPER FOR SELF BINDING HARVESTERS.

No. 458,467.

Patented Aug. 25, 1891.



Witnesses:-
Harry S. Rohrer.
William E. Knight.

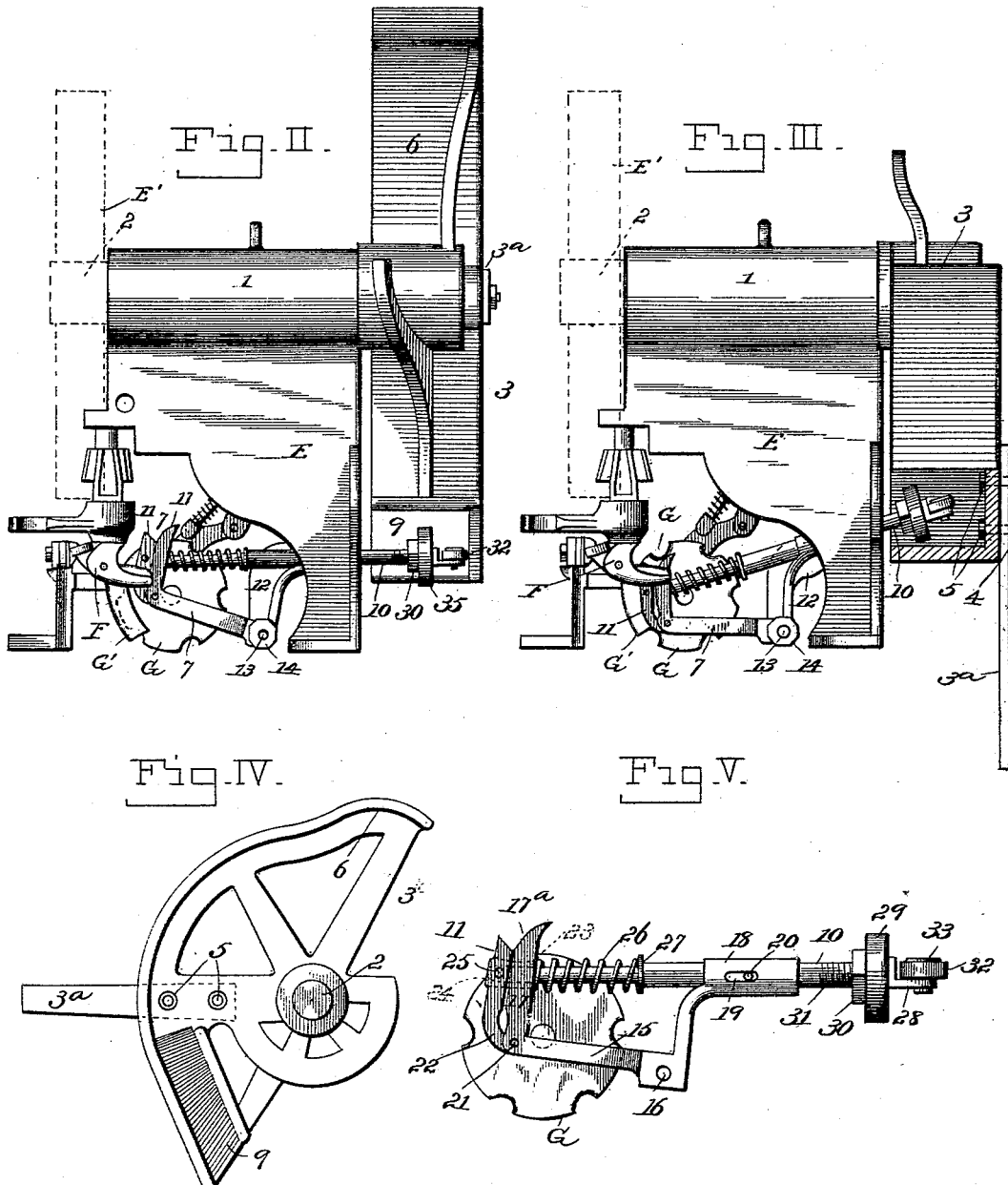
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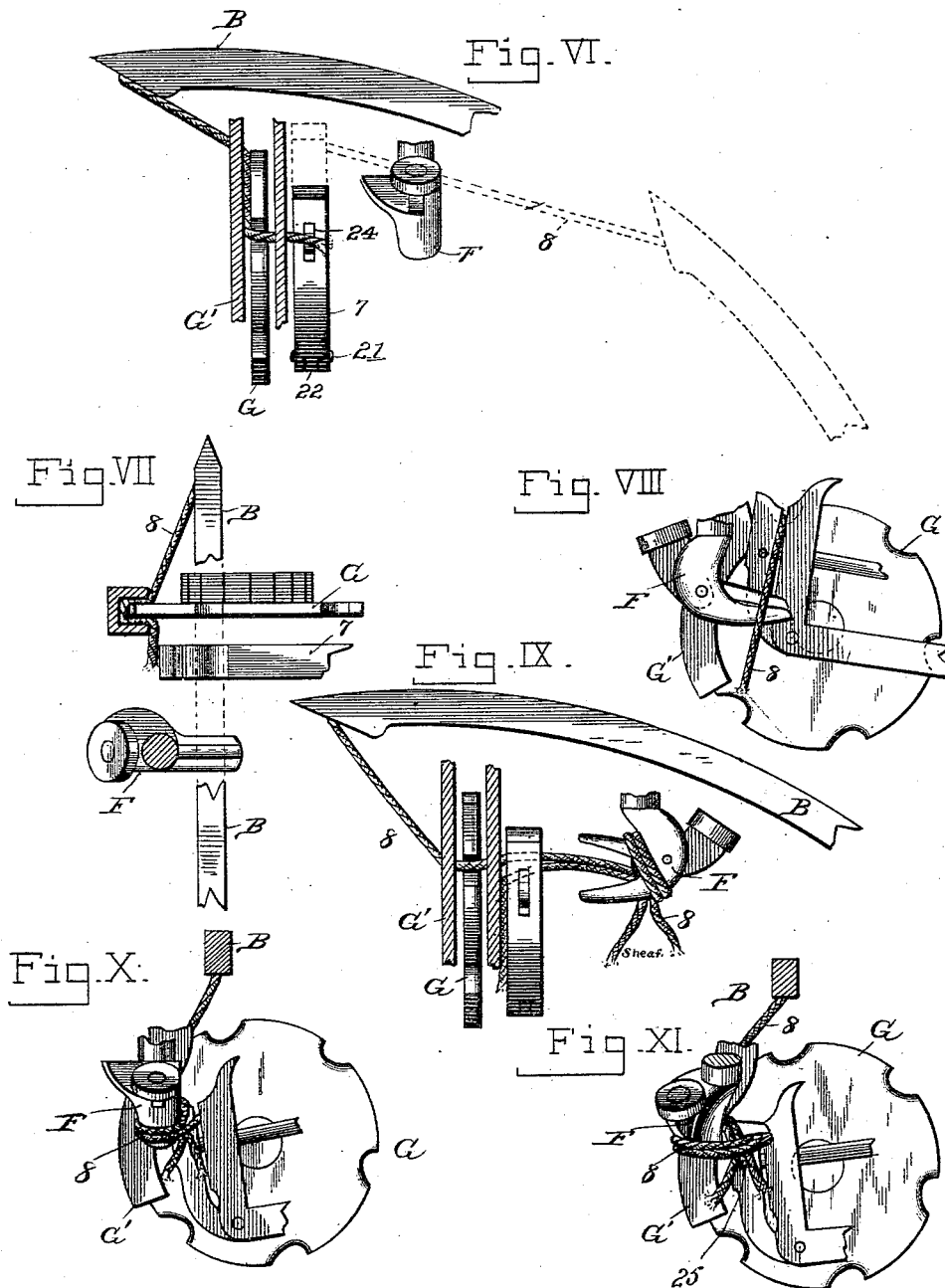
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UNITED STATES PATENT OFFICE.

ALBERT B. LANG, OF ST. LOUIS, MISSOURI.

AUTOMATIC CORD-GRIPPER FOR SELF-BINDING HARVESTERS.

SPECIFICATION forming part of Letters Patent No. 458,467, dated August 25, 1891.

Application filed November 5, 1890. Serial No. 370,386. (No model.)

To all whom it may concern:

Be it known that I, ALBERT B. LANG, a citizen of the United States, and a resident of the city of St. Louis, in the State of Missouri, have
5 invented certain new and useful Improvements in Automatic Cord-Grippers and Tension Devices for Self-Binding Harvesters; and I do hereby declare that the following specification, taken in connection with the accompanying drawings, is a full, clear, and exact
10 description of my improvements, such as will enable those skilled in the art to which they appertain to make and use the same.

Much trouble has been experienced in binding grain with the machines now commonly employed in consequence of the omission or failure at times to bind the sheaf. This failure to bind every sheaf regularly is due chiefly to the fact that the binding-cord is always
15 more or less uneven, for it is impossible to adjust the usual cord-holder and tension device to insure an even tension at all times during the passage of the swells of the cord on the one hand and its contractions on the other, so that the cord frequently breaks in
20 the first contingency, allowing the grain to be ejected unbound, and slips in the latter case, failing to effect its knot and allowing the grain to be ejected unbound or with a binding too loose to hold. Therefore it is the
25 object of my invention to construct a cord-holder with an eccentric-cam-operated movement and positive grip which will obviate this paramount difficulty; and to this end my invention consists of certain features of novelty, hereinafter described with reference to the accompanying drawings, and more particularly pointed out in the claims.

In said drawings, Figure I is a vertical section through the grain-table of the binder, showing the needle in its backward movement after the cord has been cut. Fig. II is a front elevation of the knotter-frame and cam, taken from the needle side, and showing the gripper in its normal position with its jaws closed. Fig. III is a similar view showing the gripper in its tilted position with the jaws closed, but ready to open and grasp the cord. Fig. IV is an inside elevation of my
30 improved duplex cam. Fig. V is a detail view of my improved gripper on an enlarged scale, showing its normal position with relation to

the notched disk of the cord-holder. Figs. VI, VII, VIII, IX, X, and XI are detail views of the detached parts, showing the several positions of the parts during the operation of forming a knot. Fig. VI is a side elevation, partly in section, showing the cord properly threaded in the cord-holder and needle and the needle in its extreme forward position
55 just ready to make its backward stroke, as indicated in dotted lines. Fig. VII is a plan view of the same. Fig. VIII is a front elevation, the parts being in the same position as shown in Fig. II, and showing the cord after it has been laid across the knotter-bill by the needle. Fig. IX is a similar view to Fig. VI, showing the needle in the same position, but after it has completed the shock, the loop having been formed around the knotter-bill, the gripper
60 securely holding the short end of the cord and tilted to its operative position, and the bill opened to grasp both strands of the cord for forming the knot. Fig. X is a front elevation of the same, the gripping-jaws being ready to open and release the short piece of cord after it is severed and grasp the cord again in a new place when laid in position by the backward movement of the needle. Fig. XI is a similar view showing the knotter-bill
65 closed onto the cord ready to complete the knot, the gripper having let go of the cord and being open ready to receive the cord again from the needle.

Like letters of reference indicate the same parts throughout the several views.

A is the binder-table, and B the needle. C C are the grain-packers, and D is the breast-plate, all of which parts are constructed exactly the same as in an ordinary binder.

E is the knotter-frame, bolted, as usual, to the breast-plate D. This knotter-frame has a sleeve 1 formed in its upper end, and in this sleeve is journaled the outer end of the shaft 2, having keyed to it on opposite sides of the knotter-frame the customary cam-wheel E' (shown in dotted lines) and the improved duplex cam 3.

F is the knotter-bill, and G G' the ordinary notched cording-holding disk and shoe, which are operated in the customary manner.

3^a is the ejector-arm that discharges the bound sheaf, said arm being secured to the outer surface of the duplex cam 3 by means

of screw-bolts 5 and nuts 4. The construction of this rotary duplex cam is clearly shown in Figs. I, II, III, and IV. 6 represents its initial or tilting cam for tilting the gripper 7 in its operating position, and 9 its secondary cam adapted to operate upon the projecting end of the actuating-rod 10 of the gripper to open the gripping-jaws for grasping the binding-cord 8.

The construction of my improved gripper 7 is clearly shown in Figs. II, III, and V. 12 represents a hanger-arm rigidly secured to the knotter-frame by screw-bolts or other suitable means, perforated at its lower end for pivotally supporting the gripper 7 in its proper position between the cord-holder G and the knotter-bill F.

My improved gripper consists, essentially, of a pivoted frame provided with automatically-operated spring-pressed jaws. 15 represents the angle-jaw frame, which is provided with a perforation 16, through which it is pivotally connected to the hanger-arm 12 by the pivot-pin 13 and screw-nut 14. 17 represents the inner jaw of the gripper, which is formed integral with the angle-frame 15 and provided with an upwardly-projecting tusk 17^a, which is adapted to engage the cord 8, presented to it by the needle, and, in combination with said needle and the rotatable cord-holding disk G, slide said cord down into the bite of the jaws when they are automatically opened by means presently to be explained. 18 is a tubular extension of said frame 15, adapted to slide longitudinally on the actuating-rod 10 and provided with an elongated slot 19, in which operates a spline-pin 20, which is rigidly seated in the rod 10 and projects therefrom on each side and limits the movement of the sleeve 18. 11 is the outer jaw, which is pivotally connected to the inner jaw at 21 by means of the foot-shank 22, which works within a slot formed at the foot of said inner jaw. The tip end of the aforesaid actuating-rod 10 passes through a perforation 23 (shown in dotted lines) in the inner jaw and through an elongated perforation 24 (shown in dotted lines) in the outer jaw, where said rod is pivotally secured by a pivot-pin 25. The slots in said jaws allow for the movement of the rod 10 when the jaws are opened and closed. The inner end of the actuating-rod is reduced in diameter for a sufficient length to provide a seat for the spiral push-spring 26, which is confined between the inner jaw 17 and a shoulder 27, formed on the rod 10. This push-spring maintains a strong spring-tension on the closure of the jaws, except when the actuating-rod 10 is forced endwise by means herein-after described. 28 represents a flanged flat head formed integral with or secured to the inner end of the actuating-rod 10. 29 represents a traveler-wheel, which is mounted upon said rod 10 inside of the head 28, and 30 is a screw-nut that is screw-seated on the screw-threaded portion 31 of said rod, thereby

confining the wheel 28 between said nut 30 and the flange of the flat head 28. 32 is a traveler-wheel pivoted to the flanged head 28 by means of a journal-pin 33, provided with a broad flat head and riveted to said flanged head for securing the wheel 32 thereto.

The most important features of my invention are my automatic gripper that grasps the binding-cord and maintains a positive hold of the same during the process of binding and knotting, and the means by which said gripper is automatically operated, the device being attachable to any self-binding harvester. Now my automatic gripper, under the influence of its duplex cams, both gathers and grips said cord at times that rightly register with the operations of the cord-holder and knotter of the machine to which my device is attached, the jaws of the gripper being automatically opened to release the cord when the sheaf is bound and the cord cut and to receive the cord for binding the next succeeding sheaf as said cord is guided by the projecting tusk of the inner jaw, in combination with the rotary cord-holder disk and needle, down into the jaws, which, as stated, automatically open both for discharging the cord of the bound sheaf as soon as cut and for the reception of the cord to bind the next succeeding sheaf.

I will now briefly describe the operation of the device, which, in view of the above statements, will sufficiently explain the automatic working of the same. The duplex cam 3 rotates in conjunction with the action of the binding mechanism in effecting the binding and knotting of the sheaf, the gripper with its jaws closed upon the short end of the cord being in its normal position, as shown in Figs. II and VIII, and the needle in its lowest position after having laid the cord for the formation of a sheaf. As the duplex cam rotates, the traveler-wheel 29, that is mounted and has its bearings near the inner end of the actuating-rod 10 of the gripper, travels over the initial cam 6, which transfers said gripper from its normal position (see Fig. II) to its tilted position, (see Fig. III,) and at the same time the needle travels forward, completing the shock and placing the cord in one of the notches of the disk G, said disk G immediately after rotating and clamping the cord in the cord-holder, and simultaneously with the rotation of the cord-holding disk the knotter-bill is revolved by the cam-wheel E' for the formation of the loop. At this point in the operation the parts are in the position shown in Figs. IX and X. The next instant the bill revolves to the position shown in Fig. XI and automatically closes down on the cord, and then the cord is severed by the oscillating knife K, the bundle ejected by the arm 3^a, and the jaws of the gripper 7 opened by the endwise traveler-wheel 32 running over the projecting secondary cam 9 of the rotary duplex cam 3, which thus releases the short end of the cord which has been cut off and holds the jaws

open in readiness to grasp the cord in a new place from the needle. Now it will be seen that after the jaws are automatically opened by the action of the traveler-wheel 32 in traveling over the projecting cam 9 the length of cord for the succeeding sheaf is laid in place by the needle and engaged by the tusk 17^a and guided into the open jaws that have just been vacated by the cord of the previous sheaf, when the traveler-wheel passes off said secondary cam 9 and the spring-jaw (having the restraint from the cam removed) immediately closes on said cord and firmly holds it while the next sheaf is bound and the cord knotted and cut, by which time the routine has been again gone through with. Now as the binding-cord is a large item of expense in harvesting grain with the self-binder the cord almost of a necessity has to be of a cheap grade, which is uneven and lumpy. Thus the necessity of the case has led to this invention, in which by automatic means (my grippers) positive tension is made with machine precision to grasp the cord at the right juncture, to open its jaws freely to receive the same, (the same opening releasing the cord of the previous sheaf,) and then to close with a positive hold on the cord during the process of binding, knotting, and cutting. It thus makes no difference to the working of this device whether the cord is even or uneven.

I claim as my invention—

1. The combination of the duplex cam 2, the automatically-operated actuating-rod 10 of the gripper 7, the angle jaw-frame 15, the tubular boxing 18, integral with said frame and working on said actuating-rod, the inner jaw 17, integral with said angle-frame, and the outer jaw 11, having a foot-shank 22 pivotally secured to the angle-frame beneath the integral jaw, substantially as and for the purpose set forth.

2. The combination of the duplex rotary cam-frame 2, that carries the initial cam 6 and the secondary cam 9, the actuating-rod 10 of the gripper, the angle-frame with its tubular boxing and integral jaw, the pivoted movable jaw, the tip of said actuating-rod passing through a perforation in said integral jaw and pivoted within an elongated slot in said movable jaw, and the spiral push-spring mounted on said actuating-rod and that

pushes against the shoulder 27 of said actuating-rod and against said integral jaw to effect the normal spring closure of said movable jaw, substantially as and for the purpose set forth.

3. The combination of the duplex rotary cam-frame 2, composed of the initial cam and secondary cam, the actuating-rod 10 of the gripper, the angle jaw-frame provided with the integral jaw 17 and the tubular bearing-box 18, the spline-pin 20, that works in the elongated slot 19 in said bearing-box, the movable jaw 11, the foot-shank of said movable jaw pivotally connected with said angle-frame, and the jaw-actuating push-spring 26, mounted on said actuating-rod, substantially as and for the purpose set forth.

4. The combination of the duplex rotary cam-frame, the initial and secondary cams in said frame, the actuating-rod 10, the angle jaw-frame and gripping-jaws, the traveler-wheel 29, mounted on said actuating-rod, and which wheel travels over the initial cam 6 to effect the working presentation of the gripper, the flanged head 28, and the screw-nut 30, which flanged head directs said traveler-wheel on its course, substantially as and for the purpose set forth.

5. The combination of the initial cam 6, the secondary cam 9, the automatically-operated actuating-rod 10 of the gripper, the angle jaw-frame with its tubular boxing and integral jaw, the movable jaw pivotally secured to said frame and to said actuating-rod, the hanger-arm 12, to which said angle-frame is pivotally secured, the flanged head 28 at the inner end of said actuating-rod, the journal-pin 33, whose tip is seated in said flanged head, and the traveler-wheel 32, mounted on said journal-pin, the said traveler-wheel arranged as it travels over said projecting cam 9 to force the actuating-rod 10 forward endwise, compressing its spring, and thus automatically opening the jaws of said gripper at the juncture when they are required to receive and discharge cord, substantially as and for the purpose set forth.

ALBERT B. LANG.

In presence of—

BENJN. A. KNIGHT,
THOS. KNIGHT.