

(Model.)

H. BEHRENS.

4 Sheets—Sheet 1.

GRAIN BINDER.

No. 305,135.

Patented Sept. 16, 1884.

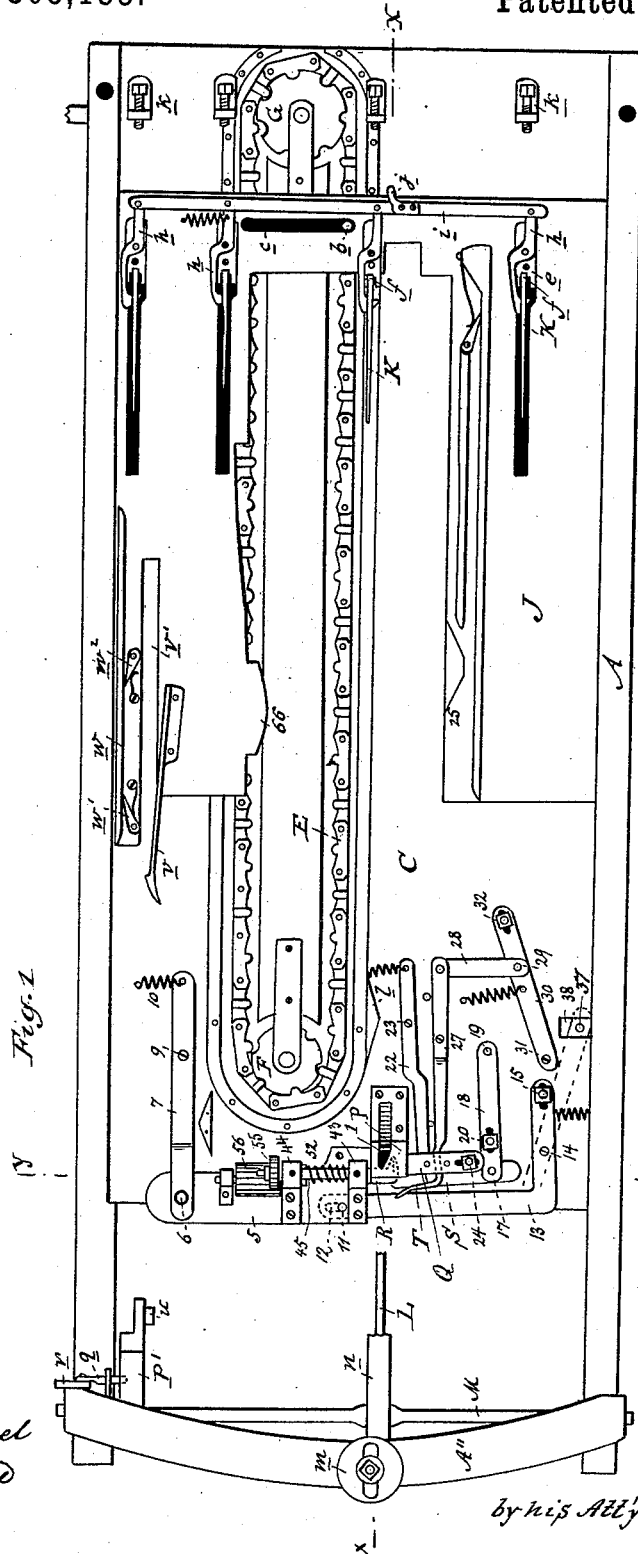


Fig. 1

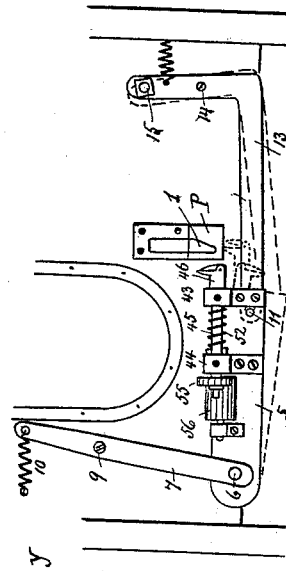


Fig. 4

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by his Atty. Thos. D. Lyman

(Model.)

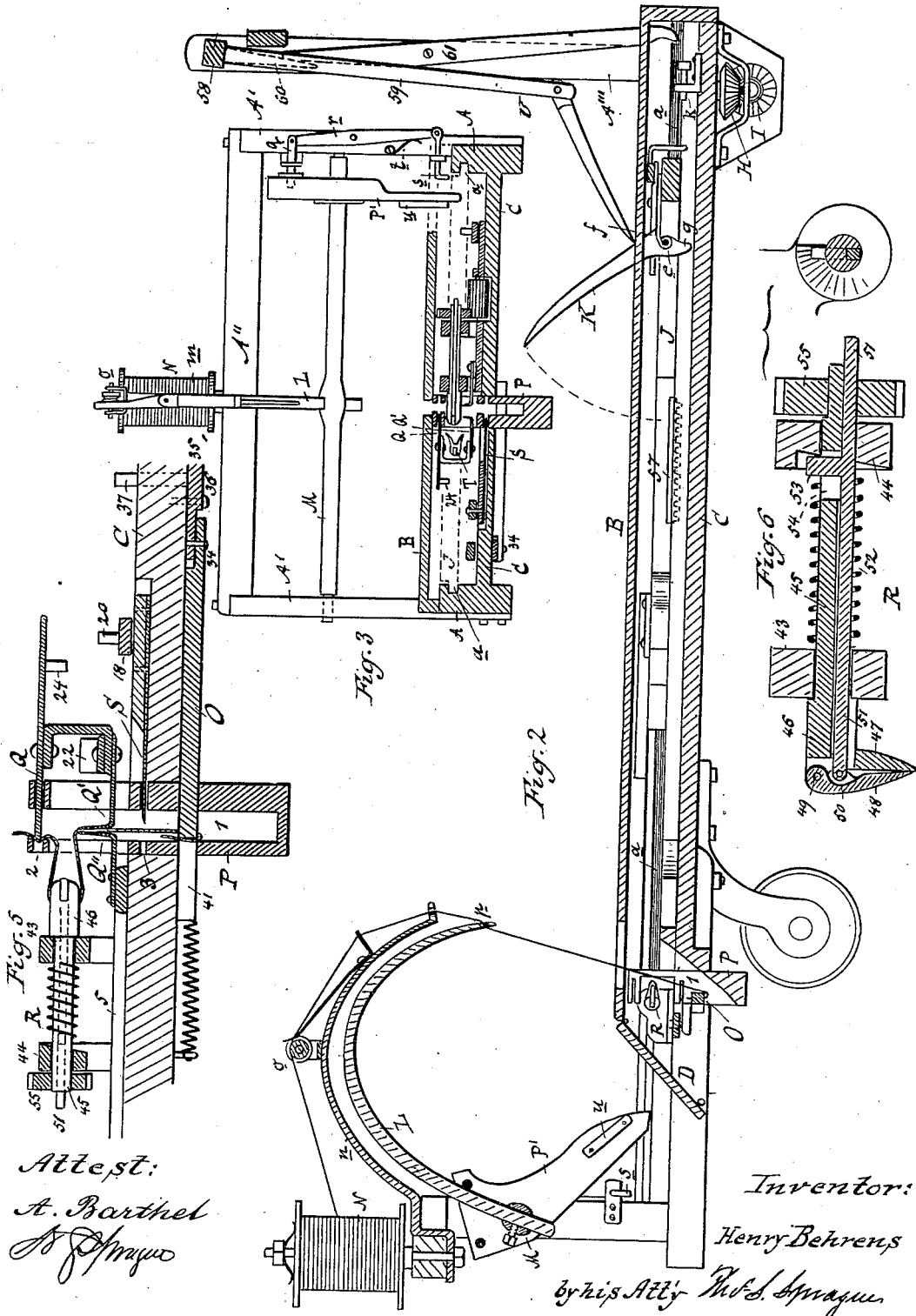
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4 Sheets—Sheet 2.

GRAIN BINDER.

No. 305,135.

Patented Sept. 16, 1884.



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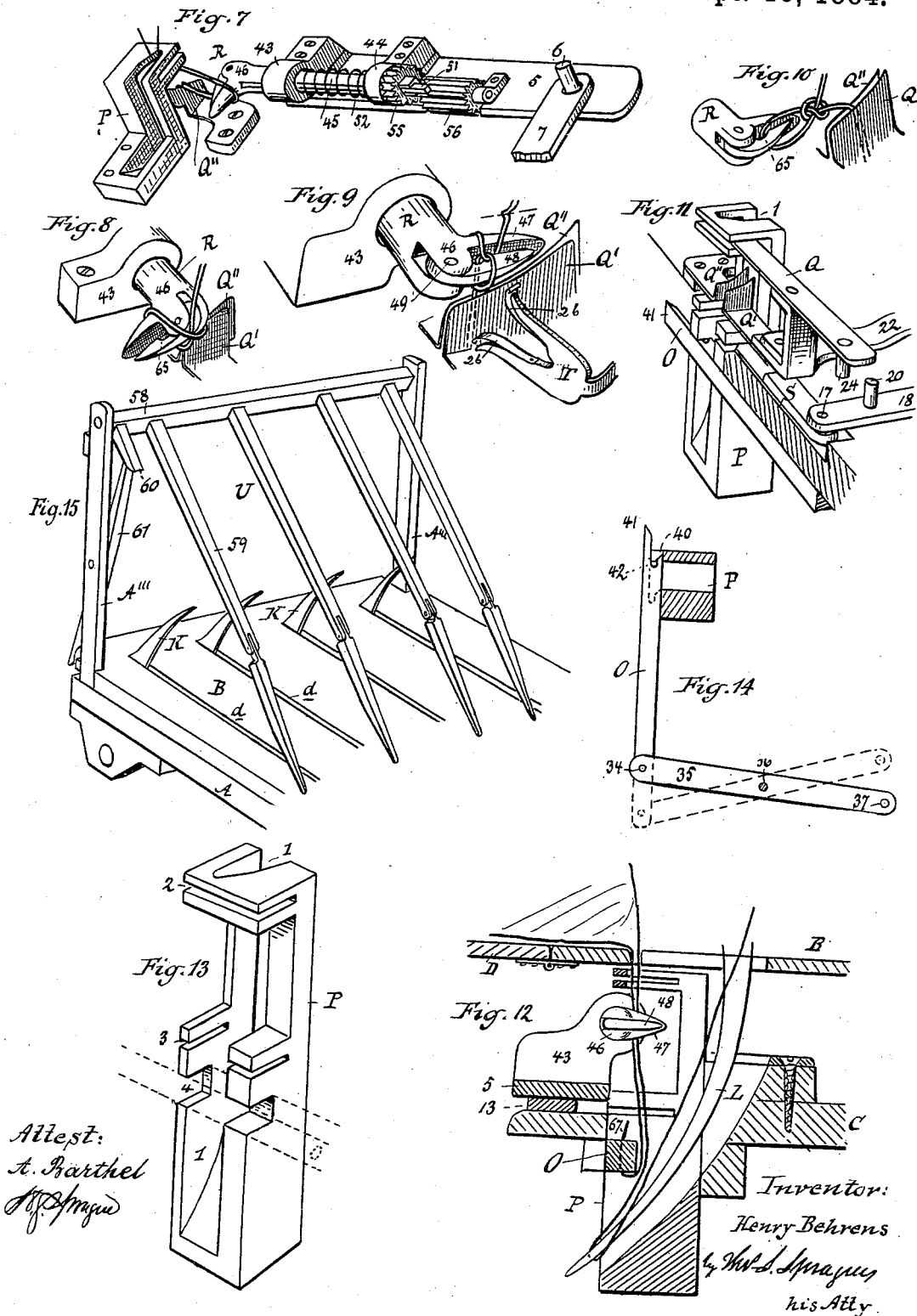
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H. BEHRENS.
GRAIN BINDER.

4 Sheets—Sheet 3.

No. 305,135.

Patented Sept. 16, 1884.



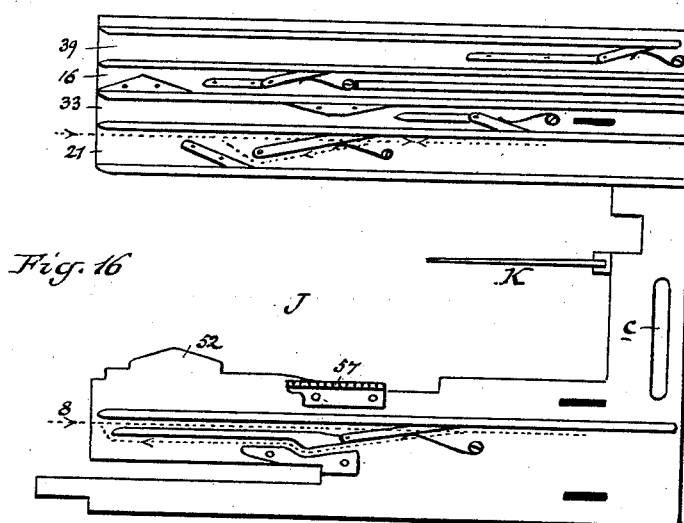
(Model.)

H. BEHRENS.
GRAIN BINDER.

4 Sheets—Sheet 4.

No. 305,135.

Patented Sept. 16, 1884.



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UNITED STATES PATENT OFFICE.

HENRY BEHRENS, OF HUNTINGBURG, INDIANA, ASSIGNOR TO FRANK BEHRENS, LOUIS BEHRENS, FREDERICK BEHRENS, JOHN H. BEHRENS, AND ENOCH HALLETT, ALL OF SAME PLACE.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 305,135, dated September 16, 1884.

Application filed June 27, 1883. (Model.)

To all whom it may concern:

Be it known that I, HENRY BEHRENS, of Huntingburg, in the county of Dubois and State of Indiana, have invented new and useful Improvements in Grain-Binders; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to new and useful improvements in automatic grain-binders; and the invention consists, first, in the mechanical construction and arrangement of the various parts for performing the different steps necessary in the operation of mechanical grain-binders; second, in the peculiar arrangement and combination of these parts into one organic structure; third, in the peculiar mechanical devices by which the power is conveyed through the media of a reciprocating carriage or switch-board to all the different operating parts, which are thereby all actuated in a positive manner, such arrangement giving also great simplicity of construction to the whole device.

The grain-binder herein described is what is termed a "twine-binder," and works on a low level. It may be attached to any side-delivery harvester in such manner as to deposit the grain upon its platform in gavels of convenient size for binding, although the binder will bind gavels of any size. The motive power is taken from the main driving-shaft of the harvester by gearing or otherwise, and may be automatically controlled by the rake-off device of the harvester, or in any other convenient manner.

In the drawings which accompany this specification, Figure 1 is a plan view of the binder with the top platform removed, so as to show the operating parts lying underneath and concealed by the same. Fig. 2 is a vertical longitudinal section of the complete binder on line X X in Fig. 1. Fig. 3 is a cross-section on line y y in Fig. 1, showing also the parts lying in rear of said section. Fig. 4 is a plan of the knot-tyer, showing it in different positions which it assumes during the process of knot-tying. Fig. 5 is a vertical central sec-

tion of the knot-tyer in its first step of forming the loop. The same figure also shows the devices for holding the twine during the process of tying the knot. Fig. 6 is another section of the knot-tyer, taken at a right angle to the one in the preceding figure. Fig. 7 is a perspective view of the knot-tyer, its position being the same as in Fig. 5. Figs. 8, 9, and 10 show perspectives of the bill of the knot-tyer with the knot in succeeding stages of perfection. Fig. 11 is a perspective of the knot-tyer block, knife, and twine-holders. Fig. 12 is a vertical central section of the knot-tyer block, showing the operation of the twine-holder. Fig. 13 is a perspective view of the twine-holder. Fig. 14 is a cross-section of the twine-holder on line Z Z in Fig. 13. Fig. 15 is a perspective view of the clearing device. Fig. 16 is a bottom plan of the switch-table.

A is the frame, of rectangular form, supporting the tables or platforms B and C, the former being the one upon which the gavels are deposited by the harvester. The platform C is supported between the frame A some little distance below the platform B, and forms a support for most of the operating parts of the binder, and it may therefore be open where such support is not needed.

D is the binding-platform. It is hinged to the rear end of the platform, and is automatically raised and dropped at the proper time, so as to form a support for the gavel while being bound, and then, by its dropping, discharge it at the rear after the binding is perfected.

E is an endless chain, supported upon the platform C and led around the sprocket-wheels F and G, the latter of which communicates motion to the chain by means of the intermeshing bevel-gears H and I, which in turn derive their motion from the main driving-shaft of the harvester in any convenient manner. (Not shown here.)

J is the reciprocating rake-head and switch-table combined. It is simply a table or board resting in guides or grooves a a in the frame A, Fig. 3, immediately below the platform B. Its reciprocating motion is obtained by means of a wrist or pin, b, projecting from the end-

less chain E, and engaging into a slot, *c*, in the forward end of the table. The top and bottom side of this table is provided with a number of tracks and switches, which, in the reciprocation of the table, are designed to engage with certain pins secured upon operating levers, and whereby the various movements are imparted to other operating parts, all as more fully hereinafter described.

K are a series of packers, hinged near the forward end of the switch-table J. They are automatically operated, so as to fold up or down at certain positions of the switch-table. When folded up, as shown in Fig. 2, they project through proper slots, *d*, Fig. 15, above the platform B, and when folded down they drop beneath the said platform.

The construction of the teeth or fingers K is clearly shown in Figs. 1 and 2, and is as follows: *e* is the hinge on which the packer turns. *f* is a shoulder, which resists its being opened farther than shown in Fig. 2. *g* is an extension of the packers, which projects below the switch-table. *h* are spring-latches, which hold the packers in position when opened. They are connected to a common cross-bar, *i*, which actuates them all together. *j* is a detent-pin attached to said cross-bar. *k* are adjustable stops secured to the platform C, near the front end thereof, and *l* is a cam attached on top of the same platform near its rear end and in direct line with the detent-pin *j*. In the reciprocation of the switch-table the raising up of the packers is brought about by the extensions *g* of the packers striking against the stops *k*, when the latches *h* spring in position and hold them open until in the further reciprocation of the switch-table the detent-pin *j* strikes the cam *l* and releases the latches from their engagement with the packers, which are then free to fold down.

L is the binder or needle arm, adjustably secured to the rock-shaft M, which is journaled at and above the rear end of the frame in the uprights A' A', which are connected on top by a cross-piece, A'', upon which is secured the twine-spool N, which may be provided with any proper tension device. Directly above, and in the same vertical plane with the needle-arm L, is the twine-guide *n*, and the twine passes through an eye in the outer end thereof to and through the eye *p* in the outer end of the binder or needle-arm, from whence it passes to the twine-holder O.

P is a rocker-arm, Figs. 1, 2, and 3. It is secured upon the shaft M, and controls the movement of the needle. *q* is a stop engaging into holes upon one side of said rocker-arm and locking it in place when the binder-arm is in any one of its two extreme positions shown in Fig. 2. The stop *q* is connected to one end of the lever *r*, whose opposite end is connected to the catch *s*. *t* is a spring acting upon the lower end of the lever *r*, and *u* is an offset upon the lower inner end of the rocker-arm.

The rocker-arm P' is operated by the switch-

table, which, for that object, is provided on its top side, and in line with the rocker-arm, with the spring-catch *v* and ledge *w*, against which the inversely-inclined switches *w'* *w''* are held by springs. In the rearward movement of the switch-table the lower end of the rocker-arm P' enters the slot *v'* of the switch-table until it strikes against the end of the slot, when the further movement of the table will turn the rocker-arm until it has brought the needle-arm in the position shown in Fig. 12. Upon the return movement of the switch-table the spring-latch *v* will engage with the offset *u* upon the rocker-arm, and carry the same back into its original position.

As above described, the rocker-arm is locked in position by the stop *q*, which therefore has to be released before the movement of the rocker-arm can take place. This is accomplished by the ledge *w* and switches *w'* and *w''* as follows: In the forward movement of the switch-table the catch *s* is engaged upon the ledge *w*, and passes the switch *w'* without losing its engagement therewith; but as soon as the switch *w'* strikes it it is temporarily drawn away from the ledge *w*, and thereby releases the stop *q* from its engagement with the rocker-arm, which immediately begins its operation, at the termination of which the stop *q* again locks it in position. Upon the return movement of the switch-table the catch *s* is held in engagement with the ledge *w* until it comes in contact with the switch *w'*, which again for a short distance draws the catch *s* away from the ledge *w*, thereby releasing the stop *q* from its engagement with the rocker-arm, allowing it to oscillate until it is locked again in position by the stop *q*. The result of one reciprocation of the switch-table is therefore withdrawing the stop *q*, oscillating the needle-arm L into the position shown in Fig. 12, and locking it there in position again, then, upon the return movement of the table, disengaging the stop *q*, oscillating the needle-arm back into its original position, and then locking it there again by the stop *q*.

P is the knotter-block, secured in vertical position near the rear end of the platform C, as shown, with its top face immediately below the platform B and its lower end extending below the platform C. It is shown detached in Fig. 13. A central recess, 1, extends from top to near the bottom vertically through the body of the knotter-block. Into this recess the needle-arm L enters, as shown in Fig. 12. A horizontal recess, 2, near the top of the knotter-block, allows the intermediate twine-holder Q, Figs. 5 and 11, to operate. Immediately below the recess 2 the knotter-block is cut away to give proper space for the operation of the head of the knotter R and the intermediate twine-holder Q', Figs. 3 and 5, and the recess 4 is occupied by the twine-holder O, Figs. 5, 12, 14, and the recess 3 is provided for the operation of the twine-cutter S.

The knotter R is journaled upon a plate, 5,

Figs. 1, 4, and 7, which is pivotally secured to a lever, 7, by a pivot-pin, 6, which projects sufficiently above the lever, Fig. 7, to engage during the reciprocation of the switch-table with a switch-track, 8, on the under side of said table. The lever 7 is pivotally secured at 9 to the platform C, and is also actuated by a spring, 10. The opposite end of the plate 5 is pivotally connected at 11 to a lever, 13, the pivot-pin passing through a slot, 12, in said lever. The lever 13 is pivoted upon the platform C at 14, and is provided upon its rear end with a pin, 15, projecting sufficiently above the lever to engage during the reciprocation of the switch-table with the switch-track 16, Fig. 16.

S is the twine-cutter, Figs. 1, 3, 5, 11. Its forward end engages into the recess 3 in the knotter-block. Its rear end is pivotally connected at 17 to a lever, 18, pivoted at 19 on top of the platform C, and provided with a pin, 20, projecting sufficiently above the lever to engage during the reciprocation of the switch-table into a switch-track, 21, on the under side of said table.

Q and Q', Figs. 1, 5, 11, are intermediate twine-holders. The former engages into the recess 2 of the knotter-block. The latter is situated a little distance below. Both are connected to the rear end of the lever 22, which is pivoted at 23 upon the platform C.

24 is a pin projecting from the under side of the intermediate twine-holder Q, and adapted to engage into the switch-track 25, Fig. 1, on top of the switch-table.

Q'' is a stationary plate secured upon the platform C, and forming an abutment for the twine-holder Q'.

T is the loop-stripper, Figs. 1, 3, and 9. Its object is to strip the loop from the knotter-head, as hereinafter explained. It is provided upon its rear end with the spring-cushioned claws 26, and is pivoted upon the platform C at 27. At its rear end it connects pivotally with the link 28, which in turn is connected pivotally at 29 to the lever 30, pivoted at 31, and provided upon its free end with a pin, 32, projecting sufficiently above the lever to engage during the operation of the switch-table into a switch-track, 33, on the under side of said table.

O is the twine holder, Figs. 2, 3, 5, 12, 13, and 14. Its free end engages into the recess 4 in the knotter-block. Its opposite end is pivotally connected at 34 to the lever 35, which is pivotally secured at 36 to the under side of the platform C, and bears upon its free end a pin, 37, which projects through a slot, 38, in the platform C, Fig. 1, and is adapted to engage with a switch-track, 39, upon the under side of the switch-table. The free end of the twine-holder is forked, as shown in Fig. 14, the inner tine, 40, being much shorter than the outer tine, 41, forming at their point of junction a contracted throat, 42.

R is the knotter, Figs. 5, 6, 8. It is journaled in bearings 43 44 upon the plate 5. It

consists of a cylindrical body, 45, a head, 46, provided with the bill-shaped stationary jaw 47 and the hinged jaw 48, the pivotal point of which is at 49. It is pivotally connected at 50 to a rod, 51, which lies concealed within a recess in the body of the knotter and projects beyond the same. A cam, 66, secured to the switch-table, is adapted to engage with said projection, and thereby open the jaw 48 forcibly against the action of the coil-spring 52, arranged around the body of the knotter between the bearing 43 and the arm 53, which latter is an offset of the rod 51, and passes through a slot, 54, in the body of the knotter. Secured to one end of the knotter is the pinion 55, which meshes with a spur-gear, 56, journaled upon the plate 5. This latter spur-gear is adapted to engage during the reciprocation of the switch-table with a rack, 57, secured thereto on its under side.

The bearing 44, in which one end of the knotter is journaled, is cam-shaped on the inside, as shown in Fig. 6. This cam is adapted to project the rod 51 during the revolution of the knotter by its engagement with the arm 53, which is held thereon by the action of the spring 52.

To the forward end of the frame A are secured the uprights A'' A'', to which the packer-guard U, Figs. 2 and 15, is secured. This guard consists of the cross-head 58, journaled into the standards A''. Secured to this cross-head are the jointed guard-fingers 59 and an arm, 60. A lever, 61, is pivoted to one of the standards, and adapted to strike with its upper end against the arm 60.

The operation of this grain-binder is as follows: Supposing it was connected to a side-delivery harvester in the manner indicated above, at the delivery end of its platform, and on a corresponding level with it, the gavel from the harvester would be deposited by a harvester-rake upon the platform B of the binder, and if motion is now communicated to the endless chain E the switch-table will begin to reciprocate, carrying the packers K with it toward the rear end of the machine. This movement also carries the gavel to the rear end of the machine, where it impinges against the twine, which passes from the eye of the needle down to the twine-holder, where its end is firmly secured. The pressure of the gavel will now draw the necessary twine from the twine-spool, and as soon as the gavel is far enough at the rear the needle-arm begins to oscillate, actuated by the rocker-arm P and the devices acting in combination therewith. This movement encircles the gavel completely with the twine, as shown in Fig. 12. The gavel being now in its proper position for binding, the switch-table returns and the teeth or fingers, being tripped by the action of the cam 6, will drop below the platform B and not fold up again until the rear ends, g, of the packers strike against the stops k, which forces them to again raise up. Before the switch-table has finished its for-

ward movement it strikes against the lower end of the lever 61, which oscillates the clearing device in such manner as to force the guard-fingers to clear the platform B from any grain which may have been deposited there since the teeth or fingers have traversed the platform. This movement takes place immediately before the teeth or fingers are raised up again, thus facilitating them to perform this movement without hinderance, and enabling them to collect the whole gavel before them without wasting any grain, which otherwise might drop off the front end of the binder.

The knot-tying is accomplished while the switch-table is carried by the endless chain from the rear toward the front end of the machine, and is performed in the following manner: The pin 6, which has been described as engaging with the switch-track 8, will, by reason of said engagement, (its path is shown in dotted lines in Fig. 16,) draw the plate 5 laterally into the position shown in Figs. 4 and 5, thereby drawing the twine over its jaw 47. Meantime the knotter begins to revolve, owing to the engagement of the rack 57 with the spur-gear 56. This forms the loop of the knot; and to form said loop upon the head of the knotter, so as to leave the movable jaw 48 free to open, the knotter moves into the position shown in Fig. 4 in dotted lines, owing to the engagement of the pin or stud 15 into the switch-track 16, which engagement oscillates the lever 13 in the proper manner. During the revolution of the knotter the cam-bearing 44 of the knotter has opened its hinged jaw 48, and the intermediate twine-holders, Q and Q', have clamped the twine on either side of the knot-tyer, as shown in Fig. 5, before it begins its revolution, owing to the action of the stud 24 engaging into the switch-track 25. The switch-tracks 8 and 16, into which the pins or studs 6 and 15 engage, govern the position of the knotter during the entire operation of knot-tying, and from the position shown in dotted lines in Fig. 4 they have approached the knotter toward the intermediate twine-holders, Fig. 8, so that in the further revolution of the knotter its open jaws will straddle the lower intermediate twine-holder, Q' Q'', and allow the twine, which is clamped by the same, to enter between the jaws. As soon as the jaws have turned clear of the plates Q' Q'', which form the lower intermediate twine-holder, they are forcibly closed by the action of the spring 52, the cam 44 having ceased to act. The knotter has now finished one entire revolution and ceases to revolve further, but begins to draw away from the intermediate twine-holders, Fig. 10, and as soon as the knotter begins to withdraw the loop-stripper T embraces the knotter-head with its forked end, (owing to the action of the pin 32 engaging into switch-track 33,) and while the knotter-head is still receding strips the loop from the jaws. The twine which has entered between the jaws is still held there, and is prevented from slipping out by a notch, 65, Fig. 10, at the base of the

movable jaw. This allows the knotter to draw the knot tight, and the finished knot is now released from the knotter by the engagement of the cam 66 upon the end of the rod 51, which opens the jaw and lets it escape. Now, the action of the knot-tyer is at an end, and it draws back into its starting position shown in Fig. 1. The cutting off of the twine is now effected by the knife S, Fig. 5, which is actuated thereto by the pin 20, which is engaged by the switch-track 21, whose action produces a reciprocation of the knife at the proper time. During the whole process of knot-tying the needle-arm has remained in the position shown in Fig. 12; but before the action of the knife S takes place, and while the intermediate twine-holders, Q and Q', still clamp the twine, the twine-holder O is reciprocated, owing to the engagement of the pin 38 with the switch-track 39. During this reciprocation of the twine-holder that portion of the twine marked 67, which lies against the inner face of the twine-holder, slips into the throat 42, Fig. 14, and is firmly held therein as soon as the twine-holder has again returned to its original position, in which it presses the twine in two places against the wall of the knotter-block, Fig. 14. After the knife S has completed its action, the needle-arm L withdraws into its original position, the end of the twine, being held in the twine-holder and forming a half-hitch around the same, extends through the knotter-block and through the eye of the needle, ready to receive a new gavel, and one complete operation of the binder has been performed. During the binding the gavel has laid upon the hinged table D. This table, after the sheaf is completed, may be dropped automatically by the switch-table, a suitable device being arranged for that purpose. The raising of said binding-table is also performed by the switch-table, which passes underneath the binding-table during its rear movement, and furnishes thereby a convenient means for lifting the same into position. To relieve all unnecessary friction, the switch-table may rest upon friction-rollers, and the pins or studs which engage with the different switch-tracks may also be provided with friction-rollers, and all parts which require adjustment may be secured adjustably in place, and springs may be used wherever desirable to keep the operating parts in their normal positions. The rear end of the binder may be supported on a caster-wheel in the ordinary manner.

From the description it will be seen that during the process of knot-tying temporary twine-holders are used, which hold the twine on either side of the knotter and in close proximity thereto, insuring thereby a more accurate action of the same, as there is less chance for the twine to be displaced. Moreover, the knot can be made much tighter, as the knotter gets no slack on the twine from the bundle after its action has commenced.

The method of imparting motion to the different parts by a system of levers and switch-

tracks, as shown, has the great advantage of making all motions positive and of excluding all complicated machinery, and if any break down should occur from any cause whatever the damage can ordinarily be repaired in any blacksmith-shop; but, aside from this simplicity of the parts, such a system has also the advantage of requiring but little space in a vertical direction, which is a necessary consideration in low-level binders.

What I claim as my invention is—

1. A grain-rake consisting of a series of teeth or fingers hinged to a common cross-head, which is reciprocated between stationary guides, in combination with the rear extensions, *g*, of the teeth or fingers, stops *k*, latches *h*, and devices for tripping them automatically, all combined and operating for governing the folding up and down of the packers, substantially as described.

2. In combination with a stationary grain-platform and a reciprocating gavel-rake provided with teeth or fingers raising and dropping automatically above or below said platform, a clearing device consisting substantially of a rake journaled above the platform, and provided with jointed fingers which touch the platform, the whole so arranged that the outward movement of the rake-head will force the fingers to clear a desired spot upon the platform from grain, substantially as and for the purposes described.

3. In combination with the stationary grain-platform and the reciprocating gavel-rake provided with automatically-folding teeth arranged below said platform, a clearing device consisting of the cross-head 58, journaled in uprights *A''' A'''*, jointed clearing-fingers 59, arm 60, and lever 61, pivoted to one of the uprights, and reaching with its lower end into the path of the reciprocating rake-head, whereby a quick movement of the fingers is obtained, substantially as and for the purposes described.

4. In a grain-binder, and in combination with a stationary grain-platform and an endless chain deriving its motion directly from the harvester, the combined rake-head and switch-table *J*, reciprocated by the endless chain, and constructed and arranged, substantially as described, to transmit motion to all the operating parts of the binder, substantially as and for the purposes set forth.

5. In a grain-binder, the devices for oscillating its binder-arm and locking it in position, consisting of the rocker-arm *P'*, catch *u*, stop *g*, lever *r*, spring *t*, and catch *s*, in combination with the reciprocating switch-table *J*, spring-latch *v*, and switch track *w w' w''*, substantially as described.

6. In a grain-binder, a knotter journaled in suitable bearings provided with an inner stationary jaw and an outer jaw hinged thereto, a rod, 51, pivoted at one end to the movable jaw and passing through and extending beyond the body of the knotter, in combination with the arm 53, projecting from the rod, a

spring interposed between said arm and one of the bearings, and the cam 66, adapted to bear against the exposed end of the rod 51 and liberate the finished knot, substantially as described.

7. In a knotter substantially as described, the bearing 44, cam-shaped upon its inner face, and cam 66, attached to the reciprocating rake-head, in combination with the arm 53, rod 51, hinged outer jaw, 48, and spring 52, all combined substantially as and for the purpose described.

8. The combination, with a knotter, of a supporting-plate, 5, pivoted at opposite ends to vibrating levers 7 and 13, adapted to carry the plate 5 endwise and sidewise, in combination with devices for operating said levers for the purposes of drawing the knotter in the different positions required, substantially as described.

9. The combination, with a knotter and its supporting-plate 5, of the vibrating lever 7, pivotally secured thereto, pin 6, switch-track 8, vibrating lever 13, pivotally secured to plate 5 by pin 11, working in slot 12, pin 15, and switch-track 16, all combined and operating substantially as and for the purpose described.

10. The combination, with a knotter, of means for drawing the supporting-plate 5 of the same rearward or forward, in whatever position it may be adjusted endwise by the lever 7, said means consisting of the vibrating lever 13, pivoted to plate 5, pivot-pin 11, working in slot 12, and provided upon its opposite end with a projecting pin, 15, in combination with the platform having the switch-track 16, the movement of the platform causing the proper vibrations of lever 13; all in the manner described and shown.

11. The combination of the knotter, the vibrating lever 7, the plate 5, provided with projecting pin 6, and the platform having the switch-track 8, all arranged and operating as described.

12. In a grain-binder, the knotter *R*, mounted on the plate 5, substantially as described, in combination with the lever 7, pivoted to said plate, the pin 6 on said lever, and the switch-track 8 on the switch-table, the rack 57, spur-gear 56, pin 15, switch-track 16, and lever 13, the parts being combined, arranged, and operating substantially as herein shown and described.

13. In a grain-binder, the upper and intermediate cord-holders, *Q* and *Q' Q''*, the holder *Q* and the movable part *Q'* of the intermediate cord-holder being rigidly connected together and constructed to be operated simultaneously, the former constructed to force the twine in a recess in the knotter-block, the latter constructed to clamp the twine between its stationary part *Q''* and its movable part *Q'*, substantially as and for the purpose described.

14. The twine-holders *Q Q'*, connected to one common lever, 22, in combination with the pin or stud 24 and switch-track 25, whereby the lever 22 is vibrated at the proper time

for clamping the twine, substantially in the manner described.

15 15. The lower twine-holder Q' Q'', consisting of a stationary vertical plate and a movable vertical plate adapted to close upon each other, in combination with a rotating knotter and means for operating it, whereby the jaws are caused to straddle and turn clear of said holder, substantially as and for the purpose
10 described.

16. The upper twine-holder, Q, consisting of a plate adapted to move in a recess, 2, in the knotter-block, and acting in conjunction therewith to hold the twine, and provided with
15 a pin, 24, adapted to engage the switch 25 on the reciprocating table J, substantially as described.

17. The reciprocating twine-cutter S, mounted on the stationary table C, in combination
20 with the lever 18, pivoted to said cutter S, pin 20, and switch-track 21 on the reciprocating table J, the parts being constructed, arranged, and operating substantially as and for the purpose herein shown and described.

25 18. In a grain-binder, in combination with

the knotter and devices for holding the ends of the twine in a fixed position on either side thereof, the stripper T, held in a stationary position, and constructed to embrace with its forked end the head of the knotter back of the
30 loop, whereby when the head of the knotter is withdrawn in a direct line from the twine-holding devices the loop is prevented from following said knotter, substantially as and for the purpose specified.

19. The combination of the loop-stripper T with link 28, lever 30, pin 32, and switch-track 33, substantially as and for the purposes
35 described.

20. The twine-holder O, substantially as described, in combination with its actuating-lever, pin 37, spring 68, and switch-track 39, whereby the twine-holder is laterally projected and retracted at the proper time, substantially
40 as and for the purpose described.

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Witnesses:

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