4 Sheets—Sheet 1.

C. VAN HOUTEN.

Grain-Binder.

No. 208,002. Patented Sept. 10, 1878.

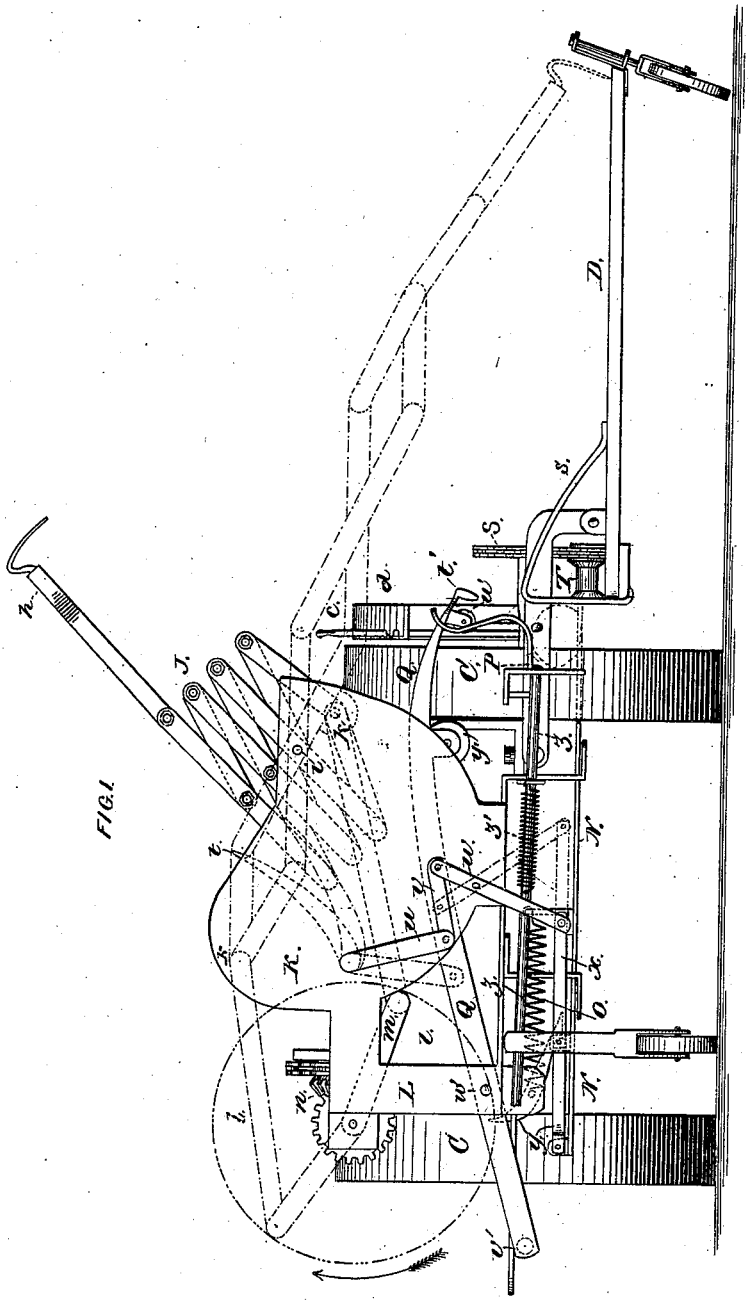


FIG. 1.

WITNESSES:

John F. R. Prince

Edw. C. Byrn

INVENTOR:

C. Van Houten

BY

Munn & Co

ATTORNEYS.

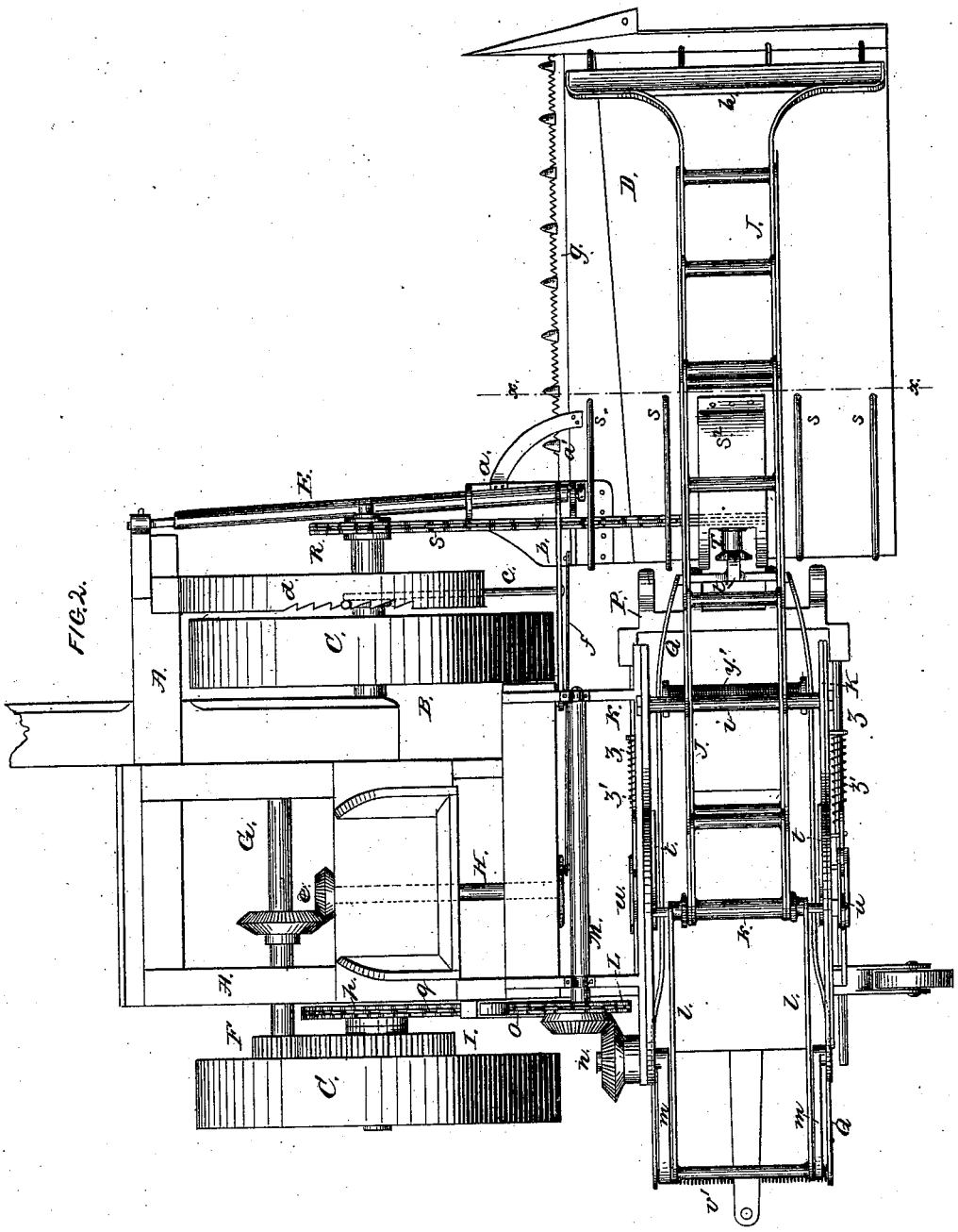
4 Sheets—Sheet 2.

C. VAN HOUTEN.

Grain-Binder.

No. 208,002. Patented Sept. 10, 1878.

FIG. 2.



WITNESSES:

John F. C. Prentiss

Edwd. C. Bryce.

INVENTOR:

C. Van Houten

BY

Munn & Co

ATTORNEYS.

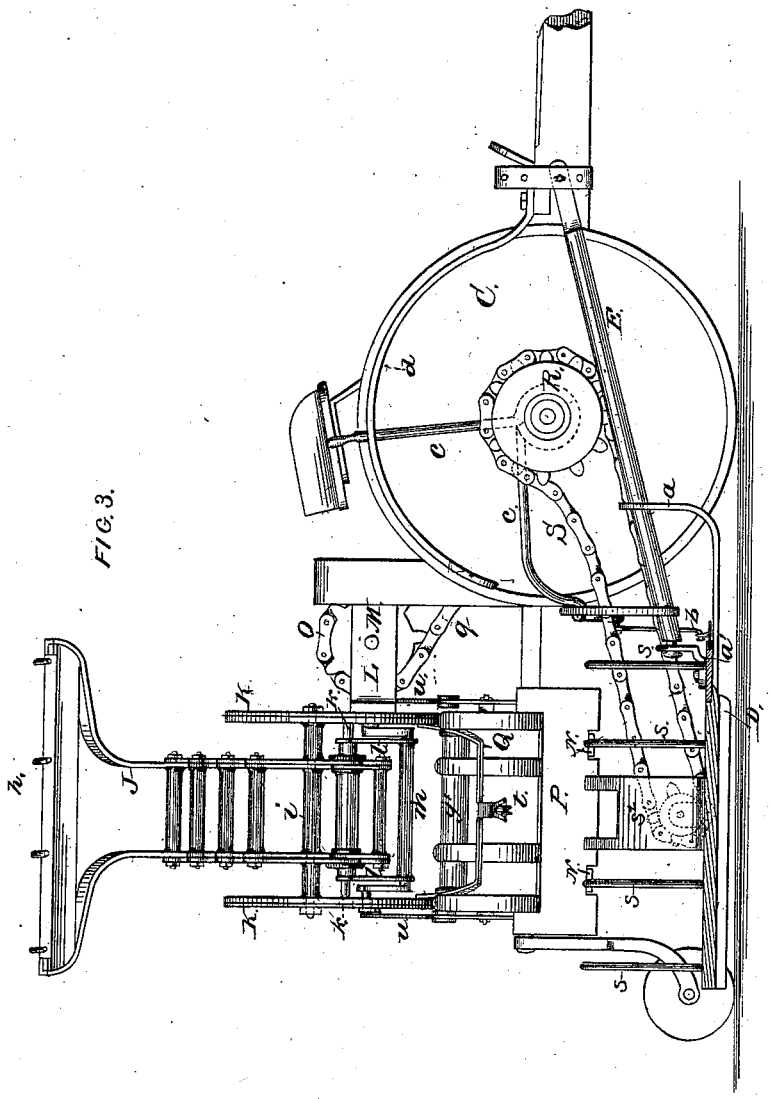
4 Sheets—Sheet 3.

C. VAN HOUTEN.

Grain-Binder.

No. 208,002. Patented Sept. 10, 1878.

FIG. 3.



WITNESSES:

John F. C. Prinkert

Edw. W. Byrne

INVENTOR:

C. Van Houten

BY

Munn & Co

ATTORNEYS.

4 Sheets—Sheet 4.

C. VAN HOUTEN.

Grain-Binder.

No. 208,002 Patented Sept. 10, 1878.

FIG. 4.

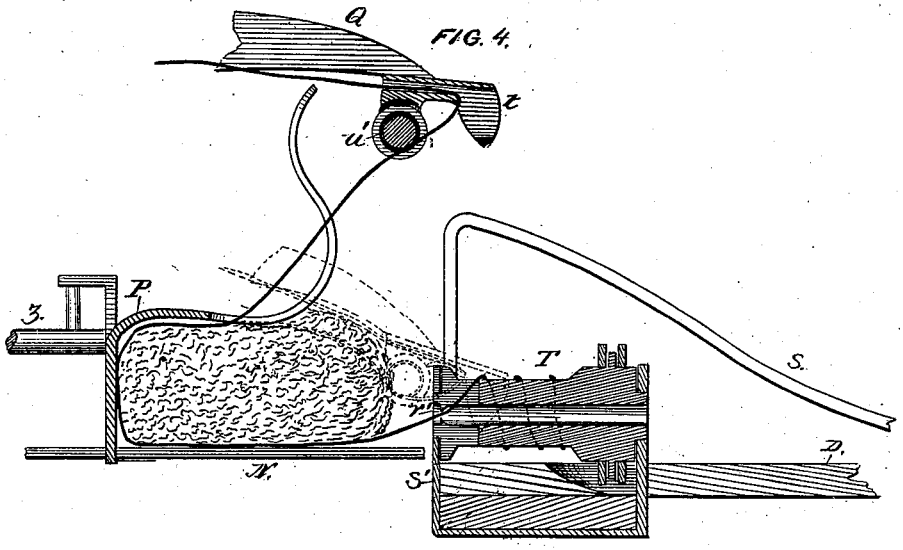


FIG. 5.

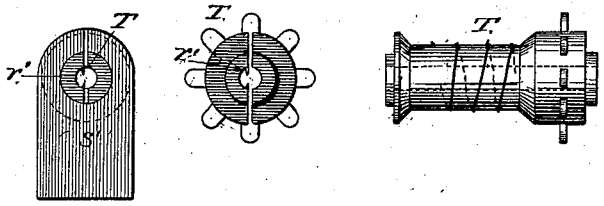
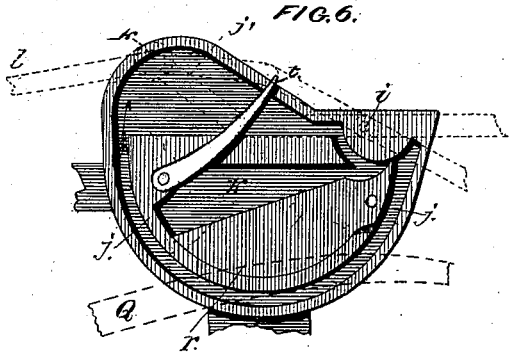


FIG. 6.



WITNESSES:
John F. C. Preinkert
Edw. W. Byrn

INVENTOR:
C. Van Houten
BY
Munn & Co
ATTORNEYS.

UNITED STATES PATENT OFFICE.

CHARLES VAN HOUTEN, OF MARION, OHIO.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **208,002**, dated September 10, 1878; application filed May 29, 1878.

To all whom it may concern:

Be it known that I, CHARLES VAN HOUTEN, of the city and county of Marion, and State of Ohio, have invented a new and Improved Grain-Binder; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is an elevation from the rear. Fig. 2 is a plan view. Fig. 3 is a side elevation with the platform in section through line *x x* of Fig. 2, said platform being dropped below its normal position to prevent obscuring other parts visible in this view. Fig. 4 is a sectional detail of the binding devices; Fig. 5, details of the twisting-spool; Fig. 6, an inside view of one of the cam-plates.

The object of my invention is to provide an improved device for raking the grain from the platform of a harvester, for binding the same into a sheaf, and for dropping it after being thus bound in consecutive operations.

The invention consists, first, in the construction and arrangement of the rake, which is carried by an extensible lever made in the form of the lazy-tongs, which device is pivoted upon an independent horizontal fulcrum, so as to give the rake a compound movement, due partly to the extension and retraction of the same from the movement of the lazy-tongs, and due partly to the integral oscillation of the lazy-tongs upon their outside pivots; secondly, in the peculiar construction of a slotted spool for twisting the two ends of wire around the sheaf, and its arrangement with respect to the devices for carrying the wire; thirdly, in the peculiar construction of a device for sustaining the bundle while being bound, and for dropping the same afterward; fourthly, in the peculiar construction of cams and actuating devices for moving and controlling the rake; fifthly, in the peculiar construction and arrangement of devices for exerting a sufficient pressure upon bundles of all sizes while being bound.

The invention also further consists in other details of minor importance, as hereinafter fully described, and pointed out in the claims.

In the drawing, A, Fig. 2, represents the main frame; B, the main shaft, arranged in bearings therein, and carrying the main drive-wheels C C. D is the platform, sustained at its outer end by a wheel and at its inner end by brackets *a a'*, Figs. 2 and 3, which encompass a drag-bar, E, parallel with the tongue, and which rod is adjustably attached to the main frame by a pin and a series of holes in front, and at its rear end, behind the main wheels, is connected with the main frame by a lateral brace, *b*. To this brace is attached the free end of an elbow-lever, *c*, whose fulcrum is the main shaft, and whose vertical arm is retained by a series of notches in a curved bar, *d*, which devices provide means for adjusting the platform vertically.

I, Fig. 2, is a gear-wheel arranged on the main shaft beside the main drive-wheel, and engaging with a pinion, F, on a second shaft, G, parallel with the main shaft, which shaft G communicates motion to the shaft H at right angles through a set of bevel-wheels, *e*. This shaft H carries at its rear end a disk with wrist-pin, which connects with a pitman, *f*, that drives the cutter-bar *g* of the harvester.

As so far described, the construction of the machine does not differ materially from that found in other harvesters; and I will now proceed to describe the features of the machine which constitute my invention.

J is the rake, which consists of a head, *h*, provided with teeth or tines, which head is partially inclosed by the laterally-bent terminal levers of a set of lazy-tongs.

The lazy-tongs are constructed after the well known manner of several sets of bars pivoted to each other at the center, and pivoted also at their ends to corresponding sets, so that when the ends of the bars are made to approach each other the lazy-tongs are extended, and when they are separated the lazy-tongs retract. This set of lazy-tongs, or the body portion of the rake, is pivoted at *i*, Figs. 1, 2, 3, upon an outside horizontal and independent fulcrum, consisting of a shaft extending between two plates, K K, mounted upon a platform supported by a rear extension of the main frame. This arrangement, it will be seen, makes a sort of extensible lever of the rake, the lazy-tongs permitting longitudinal movement, and the pivots allowing an oscillatory or vibrating motion, which co-operates

to give a compound motion to the rake in a single vertical plane, which permits the grain to be raked in a straight line laterally from the platform and without entangling or changing the relation of its straws.

The movement of the rake-head in performing its duty, is, first an extension into the air over the platform, a descent upon the platform, and a raking in of the grain by the passage of the toothed head over the platform; and in operating the fulcrumed set of lazy-tongs to secure this action various means may be employed. In accomplishing the desired result, however, I construct upon the inner sides of the plates K K cam-grooves *j j*, Fig. 6. The inner ends of the terminal bars of the lazy-tongs I pivot together upon a transverse rod, *k*, Figs. 1, 2, 3, 6, the ends of which rod enter the cam-grooves *j j* of the plates K K. To this rod are loosely attached links or connecting-rods *l l*, which at their ends opposite the lazy-tongs are connected with a double crank, *m*, having bearings in the frame-work L, and rotated by a shaft, M, through the bevel-gear *n*. This shaft M carries a chain-wheel, *o*, Figs. 2 and 3, and derives its motion from a corresponding chain-wheel, *p*, on the main shaft through a chain-belt, *q*, so that as the main wheels rotate from the advance of the machine the double crank is made to revolve and the links or rods *l l* drive the ends of the lazy-tongs rod *k* around the cam-grooves. Now, the devices being in the position shown in Fig. 1, with the lazy-tongs rod *k* close to the fulcrum *i* of the same, the lazy-tongs will be drawn in. As, however, the double crank moves in the direction of the arrow the lazy-tongs rod *k* is made to traverse the cam-grooves *j* away from the fulcrum, thus extending the lazy-tongs, and at the same time turning them on their fulcrum so as to reach over the platform. As the rod *k* reaches the vertical portion of the cam-grooves the rake-head descends upon the platform, as shown in Figs. 1 and 6 in dotted lines. As the rod *k* is forced by the double crank toward the fulcrum of the lazy-tongs the latter are contracted, and the rake-head made to draw the grain up to the desired point.

It will be observed that the upper portions, *j'*, Fig. 6, of the two cam-grooves most remote from the fulcrum of the lazy-tongs are made much wider, and with a considerable space for the free movement of the rod *k*. It is in this portion of the cam-groove that the ends of the rod *k* are resting at the time when the rake-head has descended upon the platform, and this free space allows the lazy-tongs to have a free and automatic adjustment from its own gravity to the platform, and causes the rake always to take the grain cleanly from the surface of the platform, whether said platform be adjusted higher than its normal position or lower than the same. This is a feature of great merit, as it permits the platform to be raked clean irrespective of its varying positions. To prevent any backward movement of the devices actuating the rake, switch-plates *r*, Fig. 6, are loosely pivoted to the plates K, so as to block the passage of the ends of rod *k* in the cam-grooves, except when moved forward and in the proper direction.

The devices for binding and dropping the bundle will now be described.

Upon the inner edge of the platform are arranged inclined bridge-bars *s* and bridge-plate s^2, Figs. 1, 2, 3, 4, which lead from the plane of the table to a point above the wire-twisting devices, which are also located at this point, as hereinafter described. Over these bridge-bars the rake-head carries the gavel of grain and deposits it upon a frame, N, Figs. 1, 3, 4, which constitutes the table for holding the bundle while it is being bound. This table consists simply of two or more flat bars connected together to form a frame, and arranged to slide horizontally in guides beneath the frame-work sustaining the rake. This frame is designed to be alternately projected to a position adjacent to the bridge-bars to hold the gavel while being bound, as in Fig. 4, and to be then, after the gavel is bound into a bundle, withdrawn from beneath the same, to allow the bundle to drop, as in Fig. 1. The advance of this table is effected by arms *t t*, Fig. 6, pivoted upon the inner sides of the cam-plates K, which arms are struck by the ends of rod *k* in traversing the cam-grooves *j* and are deflected. These arms *t*, Figs. 1, 2, are rigid on shafts which pass through the plates K, and have other arms, *u*, Fig. 1, upon the outside, which operate, through links *v*, lever *w*, and bar *x*, to advance the table or frame N. After said table is advanced, a detent, *y*, Fig. 1, retains the same in position until after the bundle is tied and the wire severed, when the double crank *m* strikes the upper bent end of the detent *y*, and allows a spring, O, to withdraw the table from beneath the bundle, and allows the latter to drop.

P, Figs. 1, 2, 3, 4, is a presser or elastic abutment, against which the bundle is pressed while being tied, and which permits bundles of different sizes to be tightly bound. This presser is provided with upwardly-curved fingers to catch the loose straws, and is held in its sliding movement by side rods, *z z*, arranged in guides in the rake-supporting frame, which rods are encompassed by spiral springs *z'*, that hold the presser forward upon the bundle.

Q is the frame carrying the reel *y'* for the wire. This frame consists of two connected bars, pivoted to the rake-supporting frame at *w'*, Fig. 1, and projecting between the cam-plates K to a position above the wire-twisting devices on the platform. This frame has its forward end, near the platform, held up by means of a spring, *v'*, at its rear end, passing under an extension from the main rake-frame, its forward end being depressed to bring it into co-operation with the twisting devices when the bundle is being tied by means of the cross-rod *k* of the lazy-tongs in traversing the cam-

grooves, the said rod striking the frame Q and causing the same to be depressed, as shown in dotted lines in Fig. 6. As the wire extends from the reel in this frame it passes through a hollow forked hook, t', below and in the rear of which is arranged a pulley, u'.

For driving the twisting device a chain-wheel, R, Fig. 3, is fixed on the end of the main shaft next the platform, and over the same passes a chain, S, which extends beneath the bridge-bars of the platform, which bridge-bars serve to keep the straw from becoming entangled therewith.

The said chain then passes around a chain-wheel on the spool T, Figs. 1, 2, 3, 4, 5, so as to give rotary motion to the latter. This spool has a hollow center, with flanges at each end, and its end next to the reel is slotted longitudinally in the plane of its axis, which slot is arranged to register with a vertical slot in the outer bearing, s^1, Figs. 4 and 5, of the spool, and the slot in which bearing is immediately beneath the portion of the wire extending from the hook to the pulley of the reel-frame when the bundle is being tied.

Now, in binding a bundle, the wire extends from the reel to the hollow hook, and from the hollow hook to the spool, about which the terminal end is wound (by the previous tying of a bundle) to give it a hold. Now, as a gavel is raked up the bridge-bars by the rake and delivered upon the table, the bundle presses against the wires and runs a sufficient quantity off the reel, which rests around the bundle as the latter lies upon the binding-table, the said bundle stretching the wire which passes from the hook and beneath the pulley, as shown in Fig 4. The end of the reel-frame then descends, the pulley u' and hook t' passing upon opposite sides to the outer flange and bearing of the spool, as shown in dotted lines in Fig. 4, so that the two lengths of the wire which extend from the spool around the bundle are forced into the registering-slots of the spool-flange and bearing to the central opening, and the spool (having been properly timed as to its revolution) rotates several times to twist the two ends of the wire tightly around the bundle. At the same time the twisting is effected an inwardly-projecting knife, r', arranged at the end of the spool, cuts off the twisted wire. The bundle being then bound and resting only on the table, the withdrawal of the latter allows the same to fall. In attaching the free end of the wire from the reel to the spool again for the next bundle, it will be perceived that the two or three turns of the spool in twisting the wire to secure the bundle also wraps about the spool several turns of the wires connected with the reel to hold the end of the wire for the next bundle.

As so far described no means have been referred to, and none shown in the drawing, for rendering the rotation of the spool intermittent, and thus preventing the continuous winding of the wire during the steps which intervene between the twisting operations. In providing for this defect I may arrange the chain-wheel R to be alternately connected with its shaft by a clutch thrown into gear by the descent of the frame Q, and to be disconnected during the intervening periods; or I may fix upon the chain S a laterally-projecting tappet, and arrange the chain about a loose chain-wheel at the end of the spool, so that when the tappet comes around it strikes the spool and rotates it, leaving the spool at rest during the intervals.

The several features of the machine having been thus separately described as to their individual construction and mode of operations, their unitary and conjoint operation is as follows: The machine being in the position shown in Fig. 1, with the bar k of the lazy-tongs close to the fulcrum of the same, and the lazy-tongs retracted and ready for one of its movements, and the table holding the bundle which has just been tied, the advance of the machine causes, through its gears, the rake to be extended over the platform by the traversing of the rod k in the cam-grooves j away from the fulcrum of the lazy-tongs.

At the time of the extension of the rake, also, the double crank operating the same strikes the detent holding the table, and allows its spring to retract said table, withdrawing it from beneath the bundle previously formed, and allowing the latter to drop. The rake then descends upon the platform, and immediately commences to draw the grain from the platform by the advance of rod k in the cam-grooves toward the fulcrum of the lazy-tongs. As the rod k advances the arms t are struck and deflected by ends of rod k, and the table N is again extended to its position beside the twisting devices, ready to receive the gavel which the rake has brought in, the table being held by its detent to this position. The gavel having been delivered upon the table by the rake and pressed compactly by the presser P, the reel-frame Q is depressed by the rod k of the lazy-tongs in the next movement of the rake, and the spool made to co-operate therewith to twist and cut off the wire. By this time the rake is being extended again, the bundle is dropped, and the reel-frame allowed to rise preparatory to the extension of the table, the raking in of the next bundle, and the tying of the same.

In defining certain features of my invention with greater clearness, I would state that I do not claim, broadly, the application of the lazy-tongs for a harvester-rake, but only its arrangement upon horizontal pivots with its rear end controlled, so as to give it a compound movement. With respect to the twisting-spool, also, the chief features of novelty rest in the elongated shank, with the spool slotted only at one end, so that both lengths of wire pass laterally from their axial position in the

spool, in contradistinction to both lengths of wire passing straight through the spool, as heretofore used.

Having thus described my invention, what I claim as new is—

1. The rake constructed, as herein described, of a set of lazy-tongs pivoted upon a horizontal fulcrum and controlled at one end, to impart to it a combined longitudinal and vibratory motion, as set forth.

2. The rake consisting, essentially, of a set of lazy-tongs pivoted upon a horizontal fulcrum and having a rod, *k*, in combination with vertical plates K K, provided with cam-grooves, substantially as described.

3. The combination, with the fulcrumed lazy-tongs carrying the rake and having rod *k*, of the plates K, having cam-grooves, the connecting-rods *l*, and the double crank *m*, geared with the main drive-shaft, substantially as described.

4. The plates K, having cam-grooves *j*, with a free space or great width of groove at the point where the rod *k* rests when the rake is upon the platform, in combination with the extensible and vibrating lazy-tongs rake having rod *k*, as and for the purpose set forth.

5. The combination of the cam-plates K and the rod *k* of the lazy-tongs, the arms *t u*, the sliding table N, and the connecting mechanism *u v w x*, substantially as described.

6. The combination of the spring-retracted table N, the detent *g*, and the double crank *m*, substantially as described.

7. The spring-seated presser P, having upwardly-curved finger, and supported upon horizontal rods arranged in guides in the framework, in combination with the extensible table, substantially as and for the purpose described.

8. The reel-frame Q, pivoted between the plates K and held up by a spring, in combination with with the rod *k* of the lazy-tongs, as set forth.

9. The rotary twisting-spool having elongated shank, and slotted at one end in the plane of its axis, substantially as described.

10. The twisting-spool with elongated shank, slotted at one end in the plane of its axis, and combined with the reel-frame Q, having a pulley, *u'*, and a bridged or forked hook, *t'*, substantially as described.

11. The spool T, having a slotted end and an inwardly-projecting knife, as and for the purpose set forth.

The above specification of my invention signed by me this 24th day of May, 1878.

CHAS. VAN HOUTEN.

Witnesses:
EDW. W. BYRN,
CHAS. A. PETTIT.