2 Sheets—Sheet 1.

J. F. STEWARD.

GRAIN-BINDER.

No. 192,603. Patented July 3, 1877.

Fig. 1.

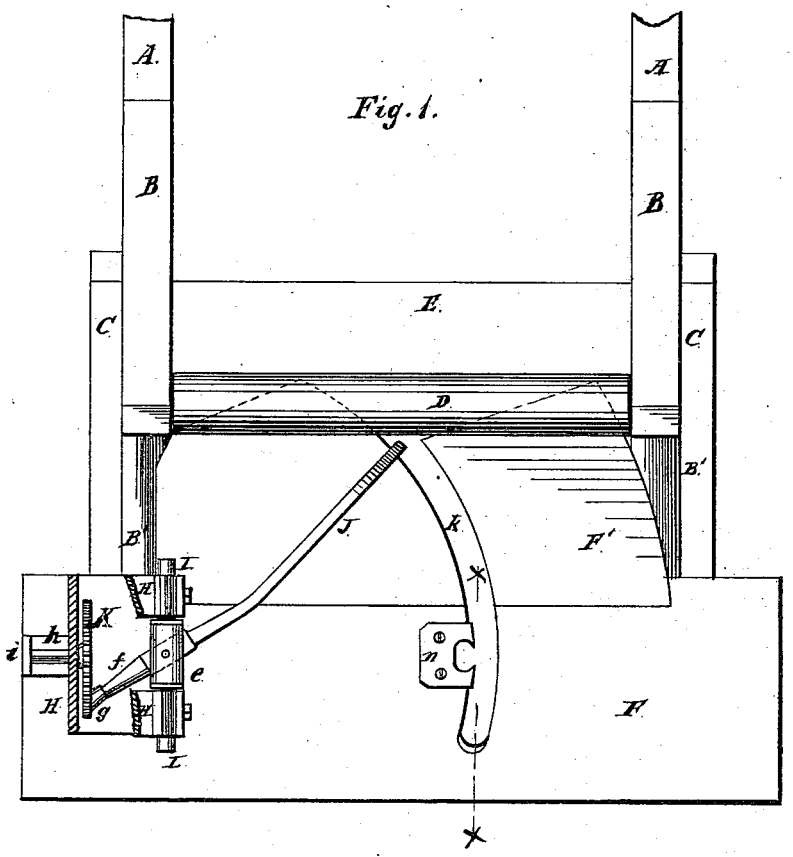
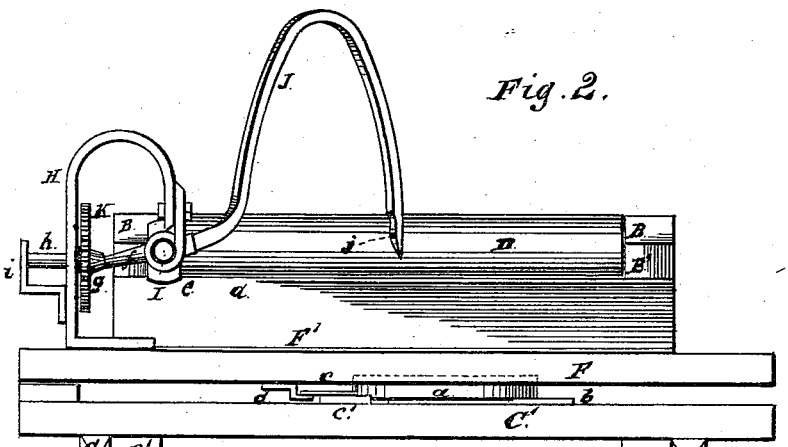


Fig. 2.



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Inventor:

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J. F. STEWARD.

GRAIN-BINDER.

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Fig. 3.

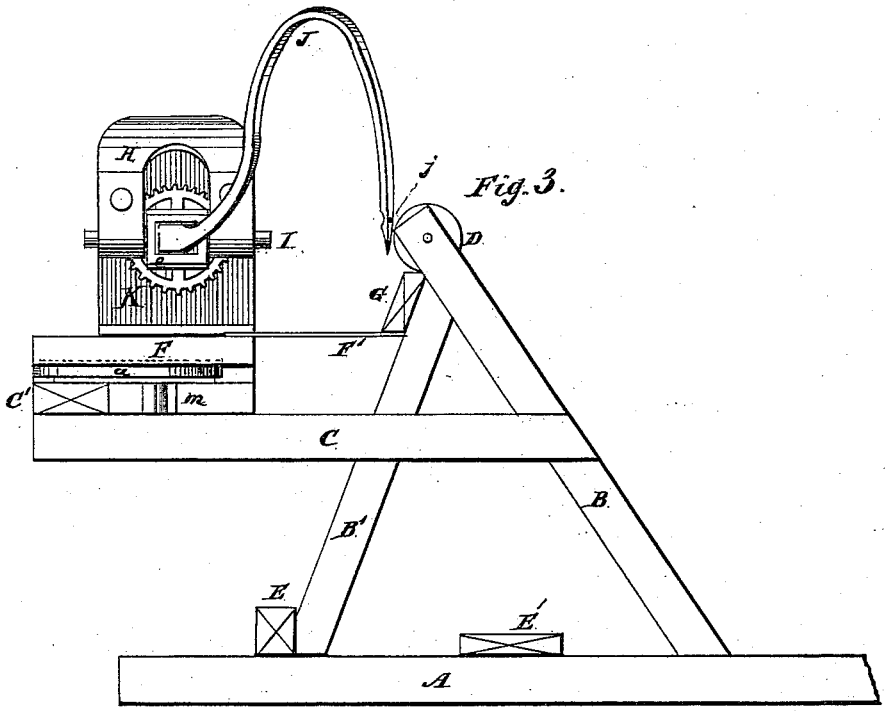
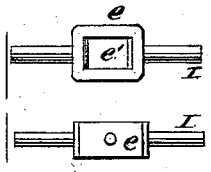


Fig. 4.



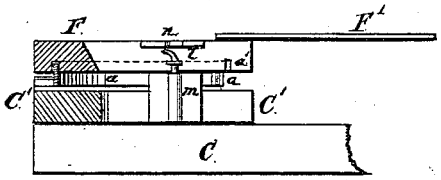


Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN F. STEWARD, OF PLANO, ASSIGNOR TO ELIJAH H. GAMMON AND WM. DEERING, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **192,603**, dated July 3, 1877; application filed May 25, 1877.

To all whom it may concern:

Be it known that I, JOHN F. STEWARD, of Plano, Kendall county, State of Illinois, have invented new and useful Improvements in Grain-Binders, of which the following is a full description, reference being had to the accompanying drawings, consisting of two sheets, in which—

Figure 1 is a top or plan view, showing the binding-arm in position to enter the grain; Fig. 2, an end elevation; Fig. 3, a front elevation; Fig. 4, a detail showing the construction of the rock-shaft; Fig. 5, a cross-section on line *x x* of Fig. 1, showing the pivot and the position of the twisting-hook.

The object of this invention is to simplify the construction and operation of the binding mechanisms and shifting devices for adjusting the binding apparatus to ranging lengths of grain in harvesting-machines; and its nature consists in pivoting a horizontal receiving-table to the main frame, in supporting the raking or binding arm upon such pivoted table with an open space below the pivot or bearing, in location of the twister, and in the several combinations of devices hereinafter described.

In the drawings, A represents the main frame; B B′, the elevator-frame; C, the cross-bar for supporting the driver's platform and seat; D, the upper elevator-roller; E E′, the cross-bars for supporting the grain or drive wheel.

These parts, A, B B′, C, D, and E E′, are constructed and arranged in any of the ordinary forms of harvesters, and the completed machine is to be supplied with the ordinary grain-carrier, reel-sickle, grain-wheel, divider-gearing for driving the sickle and other parts used in this class of harvesters; but as these parts are of the usual construction they are not shown or described.

The cross-bars C extend beyond the elevator-frame, as shown, to form supports for the binding mechanism, and a cross-bar, C′, is provided at their outer ends, on which the pivot for the receiving-platform is located.

F is the outer portion of the swinging receiving-platform, having the pivot beneath it.

F′ is a metal plate or board secured to the front of F and forming the inner portion of the receiving platform or table.

a is the pivotal ring for the table. It is of considerable diameter, and is arranged at one side of the center of the table and extends nearly or quite to the outer edge of the part F, so as to form a bearing-surface of an extent sufficient to keep the table in position when being swung.

a′ is a groove made in the under side of the part F and fitting over the top of the pivot or pivotal ring. It aids in keeping the table in place.

b are flanges on the bottom of the pivot by means of which it is secured in place to the cross-bar C′. *c* is a metal plate secured to the top of a piece, *c′*, on the cross-bar C′, and projecting beyond the edge of *c′*. *d* is a catch secured to the under side of F, and so arranged as to engage with the plate *e* and keep the table from tipping or getting out of place in swinging.

G is a cross-bar secured to the part B′ of the elevator-frame, immediately beneath the upper elevator-roller, and so arranged that the metal plate F′ can pass beneath it in the swinging of the receiving table or platform. Its object is to deliver the grain properly upon the table, and also to prevent the grain from falling through between the upper roller and the receiving-platform.

H is a frame or standard secured to the outer end of the part F of the receiving-table, to which the devices for operating the needle or binding arm are connected. Its upper end is bent or curved, as shown, so as to provide a support for the binding-arm.

I is a rock-shaft, having its bearings on the curved portion of the frame H.

e is an enlargement on the rock-shaft I, between its bearings.

e′ is an opening through the part *e*.

J is the binding-arm or needle supported on the rock-shaft I. Its rear end passes through the opening *e′*, and is pivoted therein by means of a pivot passing vertically through the enlargement *e*, so that the arm is free to turn to the right or left horizontally.

K is a cogged wheel, having its journal-support in the frame H, by means of which the needle-arm is operated.

h is the shaft for the wheel K, extending through the frame H.

i is a bracket attached to the frame H, for supporting the outer end of the shaft *h*.

Motion is imparted to the wheel K by means of a pinion geared like that shown in the application hereinbefore referred to, or in any other suitable manner. The pinion should be arranged so that it will gear properly with the wheel K in whatever position the receiving-platform or table may be swung.

f is an extension or crank in the rear end of the binding-arm.

g is a socket, formed on the wheel K, to receive the end of the crank or arm *f*, so that as the wheel is revolved the arm J will be carried up or down, and to the right or left, accordingly as the crank is carried around by the wheel. *j* is an opening in the point of the binding-arm or needle, through which the binding-wire passes.

k is a slot in the receiving-platform, for the passage of the needle when forcing the grain to the twister or tier. It is slightly curved, as shown in Fig. 1.

l is the twisting-hook, located nearly central with the pivotal point of the table, and so as to bring it in position to grasp the binding-wire when the needle commences its ascent.

m is the bearing for the shaft of the twisting-hook, secured to the cross-bar C′ in any suitable manner.

n is a guard-plate, located over the twisting-hook, and having a suitable opening for the entrance of the binding-wire when being twisted.

In operation grain is delivered on the receiving-platform from the elevator.

Fig. 1 shows the receiving-platform in the position it will occupy for ordinary or medium binding, and the needle-arm is shown in position to make its descent, and pass through the grain to force it forward to the binding devices, in which position the crank *f* is in its farthest forward side position. As the wheel K revolves it carries the crank *f* up, which movement of the crank carries the point of the needle down, so as to enter the grain and make a clean separation between that for the bundle and that brought over the elevator. As the crank continues to rise the needle-arm is carried down and forward, and this movement will continue until the crank or extension *f* has ascended to its highest position, at which time the needle has descended to its lowest point, and the grain for the bundle has been carried forward nearly to the twisting-hook or tying mechanism. As the crank or arm *f* descends, by the rotation of the wheel K it will cause the needle-arm to ascend, and at the same time carry it still farther forward, forcing the bundle forward to the twisting-hook, which grasps the binding-wire and twists the two strands together, coiling the main wire around the shank of the hook at the same time, so that its end is firmly held. The needle-arm will then move forward and up until the crank *f* has reached a side position opposite to that where it first started, which movement of the binding-arm will carry the bound bundle away from the hook or tying devices, when it can be dumped on the ground or into a suitable receptacle. As the crank or lever *f* is carried still farther around by the wheel K it will descend, which causes the arm J to rise, which movement will continue until the crank or arm *f* has reached its lowest position, when the needle has reached its highest point of ascent, and at the same time has been carried partly over to position to again enter the grain. As the crank *f* ascends toward its first position it carries the arm J over and down, bringing it into the position shown in Fig. 2, ready to enter the grain, and at the same time shutting off the flow of grain from the elevator; then the arm descends, enters the grain, and moves it forward, as before described; and this operation of the needle or binding-arm continues while the machine is in operation.

It will be observed that as the extension or crank *f* is revolved by the wheel, the outer end or needle-arm moves in an opposite direction; but owing to the action of the rock-shaft I, which has only a rocking motion, and the pivotal pin which permits the swinging or side movement, there are only two free movements.

By this arrangement the binding-arm has the ordinary reciprocating movement, and at the same time has a raking movement which forces the grain to the binding mechanism.

For the best action the binding-wire spool is to be so located that as the arm J ascends and moves over horizontally to enter the grain it will unwind just wire enough from the spool to bind the bundle, which wire will be carried over and around the bundle by the movements of the needle-arm, the grain being forced against the wire, and forming it into a loop or band by the action of the binding-arm.

Suitable devices are to be used for stopping the upward movement of the binding-arm at the time the twisting and severing are being performed.

A suitable lever is to be provided for swinging the receiving-platform, which lever is to be arranged within reach of the driver, when mounted on the machine, so that by moving the lever in one direction the rear end of the table will be carried toward the elevator-frame, which movement will carry the opening or slot *k* farther forward, bringing the parts into position for binding short grain, and by moving the lever in the opposite direction the outer end of the table F will be carried away from the elevator, which movement will bring the slot or opening farther back in relation to the elevator, so that the binding-arm can enter it for binding long grain, thus changing the position either forward or back, as the

length of the grain requires. It will be seen that this adjustment of position will direct the arm into the grain more rearward or forward as the length of the grain may require.

By locating the frame H at the extreme rear end of the receiving-platform, and supporting the rock-shaft above the table, as shown, a considerable opening is left beneath the needle or binding arm extending back to the frame, which permits the passage of long grain or weeds, so that the binding-arm and devices can remain without being adjusted on the table, regardless of the length of the grain being bound, and it enables us to shorten up the devices.

A suitable cutter for securing the binding-wire is to be arranged beneath the receiving-platform, which cutter will operate so as to cut the wire between the twisting-hook and bundle, so as to leave the main wire coiled around the shank of the twisting-hook.

Suitable gear-wheels for operating the twisting-hook are also to be provided; but as they may be of any desired form they are not shown or described.

The arrangement shown has the twisting-hook located on the platform, and stationary; but it is evident that the hook or twister might be arranged in the point of the needle, suitable devices being provided on the platform to operate the hook or twister without materially departing from the main feature of the invention, which is mounting the binding-arm on a swinging platform, so that by changing the position of the platform the direction of the binding-arm will be changed, so as to cause it to enter the grain at a point forward or back, as the length of the grain may require.

I am aware that a needle or binding arm having a reciprocating movement has been used, and also that a forward and back movement horizontally has been given to such arm; but I am not aware that such arm has ever been used with or attached to a pivoted swinging mechanism and platform for giving the binding arm or needle a forward or rearward position at the time of entering the grain, and carrying it to the twisting or tying devices.

What I claim as new, and desire to secure by Letters Patent, is—

1. The grain-receiving and binder-supporting table horizontally adjustable by swinging on a vertical pivot, substantially as specified.

2. The horizontally-swinging receiving-platform F, in combination with the arm J mounted thereon and adjustable therewith, and a twisting device located in reference thereto, so that it will operate in any change of position, substantially as described.

3. The frame or standard H, secured to the rear end of the receiving-table, and having its bearing for the binding-arm arranged above the table, to leave an opening between the table and the pivoted support of the binding-arm, substantially as shown and described.

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