4 Sheets—Sheet 1.

M. A. KELLER.

Self-Binding Harvesters.

No. 217,227. Patented July 8, 1879.

Fig 1.

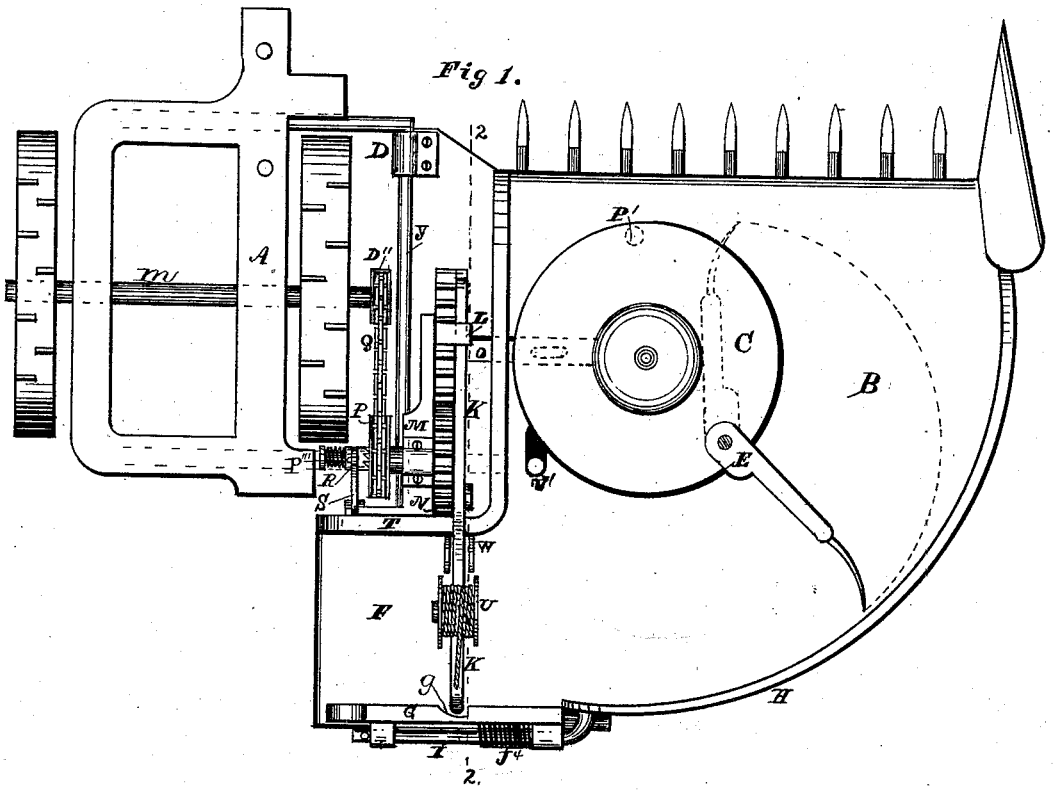

Fig 2.

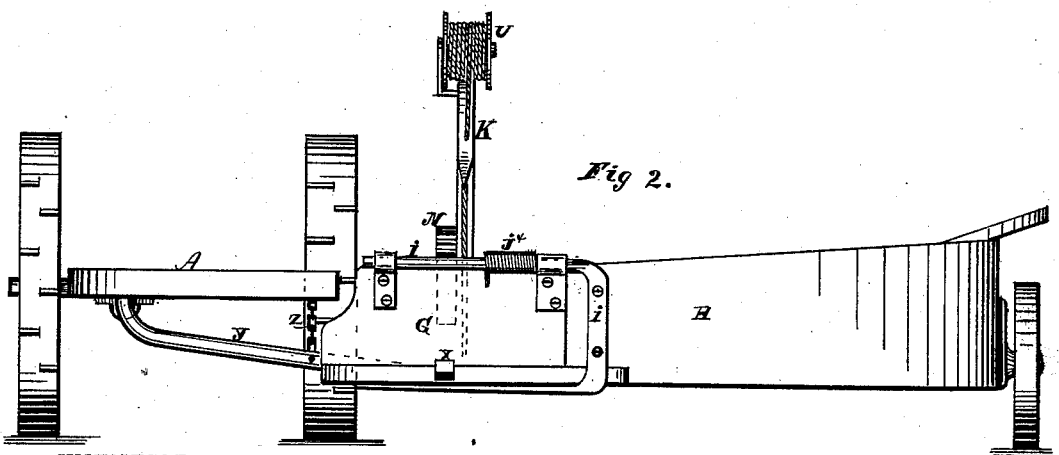

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Fig 3.

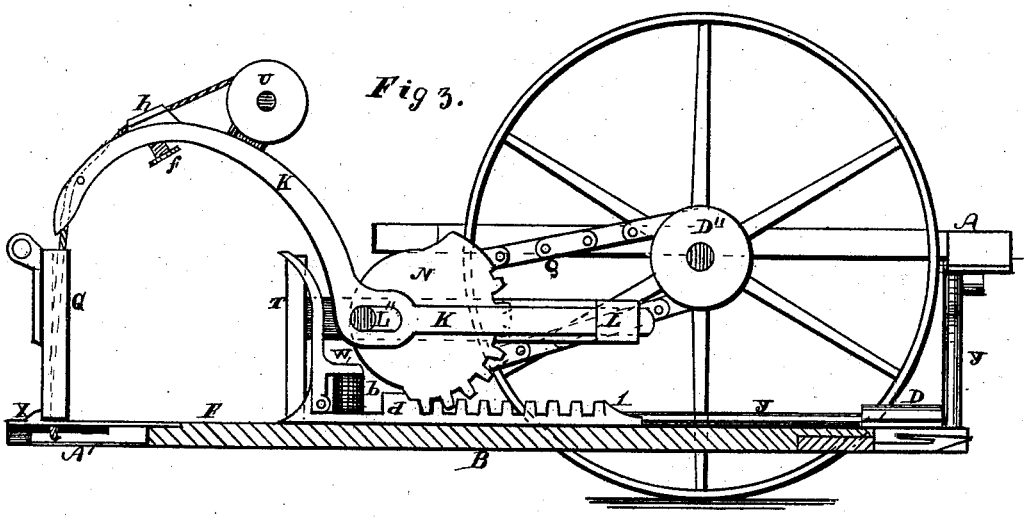
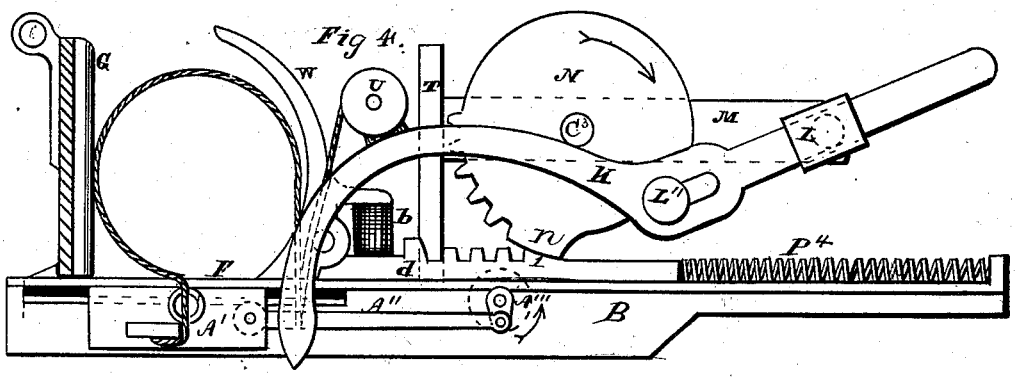


Fig 4.



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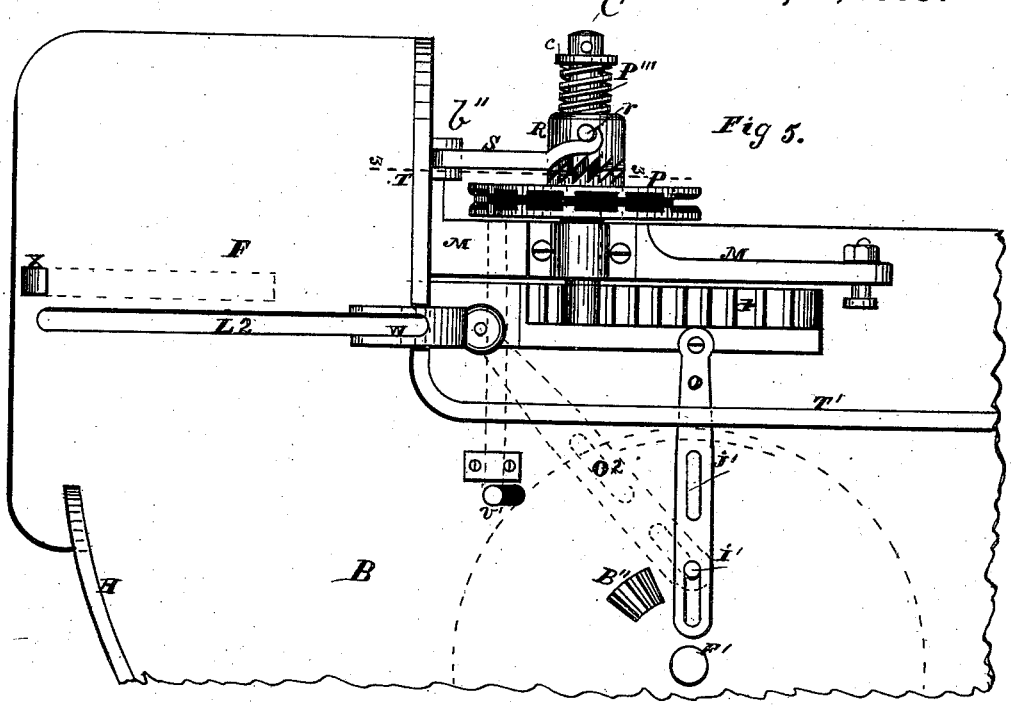

Fig 5.

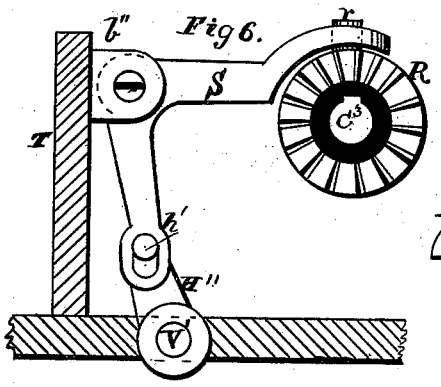

Fig 6.

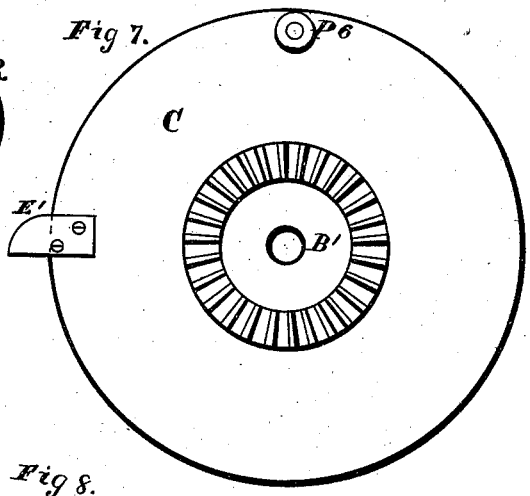

Fig 7.

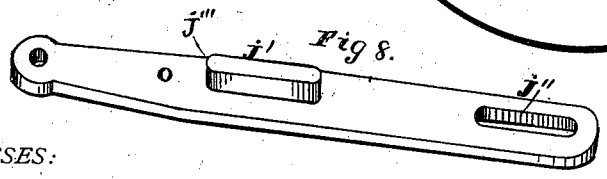

Fig 8.

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Fig. 9.

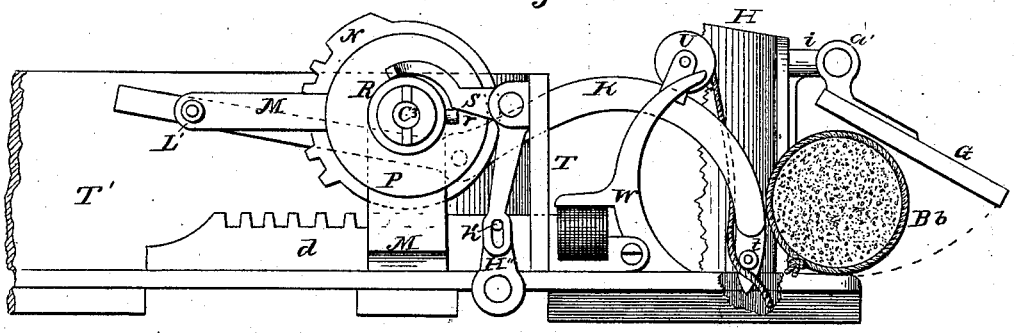
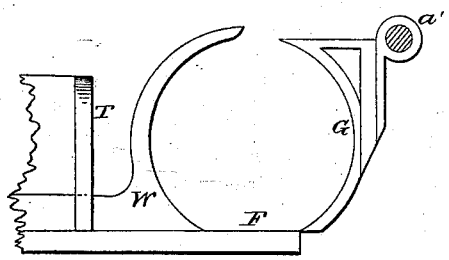


Fig. 10.



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per
F. A. Lehmann,
Atty.

UNITED STATES PATENT OFFICE.

MOSES A. KELLER, OF FREMONT, OHIO, ASSIGNOR OF ONE-HALF HIS RIGHT TO WINFIELD J. ENGLEBECK, OF SAME PLACE.

IMPROVEMENT IN SELF-BINDING HARVESTERS.

Specification forming part of Letters Patent No. **217,227**, dated July 8, 1879; application filed September 24, 1878.

To all whom it may concern:

Be it known that I, MOSES A. KELLER, of Fremont, in the county of Sandusky and State of Ohio, have invented certain new and useful Improvements in Self-Binding Harvesters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates generally to that class of self-binding grain-harvesters in which a sweep-rake is employed to deliver the cut grain upon a specially-constructed binding-table arranged at the rear inside end of a quadrant platform to receive the gavel at right angles, or thereabout, to the line in which the grain falls upon the platform, where it is bound by a suitable binding mechanism and delivered upon the ground from the rear end of the binding-table, with the butt-end next to the standing grain and out of the way of the passage of the team and machine on its next round.

That others may fully understand my improvements, I will particularly describe them, having reference to the accompanying drawings, wherein—

Figure 1 is a plan or top view of a harvesting-machine with my improved mechanism. Fig. 2 is a rear elevation of the same. Fig. 3 is a longitudinal elevation of my binding mechanism with the grain-platform removed. Fig. 4 is a longitudinal sectional elevation of the binding mechanism, taken on the line 2 2 of Fig. 1. Fig. 5 is a top view of the binding mechanism with a portion of the platform removed. Fig. 6 is a sectional elevation of the lever mechanism for stopping and starting the binding mechanism at intervals, taken on the line 3 3, Fig. 5. Fig. 7 represents the under side of the sweep-rake table. Fig. 8 is a detail view of the compressor mechanism. Fig. 9 is a longitudinal side elevation of the binding mechanism on the side next to the driving-wheels of the harvester, showing the position of the binding-arm in the act of pushing the bound gavel off the binding-table. Fig. 10 represents a compressor-board having its inside formed into a concave for the purpose of rounding up the gavel.

Similar letters of reference denote corresponding parts wherever used.

The object of the first part of my invention is to combine with a sweep-rake and a quadrant platform a supplemental binding-table arranged at the delivery end of the quadrant platform, and a hinged fender or compressor-board, G, and a suitable binding mechanism that will automatically bind every gavel that the sweep rake or rakes will deliver upon said binding-table, as hereinafter more fully described.

My improvements further consist in the peculiar arrangement of the binding-arm in relation to the binding-cord, whereby the latter is held at the rear end of the binding-table in the kerf of the compressor-board, out of the way, to receive a gavel preparatory to binding the same, to which end my improvement further consists in making the binding-arm of sufficient length to extend from its supporting-standard entirely across the binding-table, and in stopping the said binding-arm with the binding-cord in its extreme backward stroke, or nearly so. This arm being curved forms an arch over the binding-table of sufficient height to admit of an unbound gavel, and when a gavel has been delivered, it will stand and bring the band from the outside over the gavel, and carry it down on the same side as the compressor into the tying mechanism.

My improvement further consists in the novel arrangement of the shifting mechanism, whereby the entire binding mechanism is automatically set in motion, and again automatically drawn out of gear when a gavel has been bound, as hereinafter described.

In the drawings, A represents the machine proper, which includes the main frame, driving-wheels, and gearing, and which may be of any construction desired. B is the grain-platform, of the class known as the circular or quadrant platform, and this platform is connected with the main frame by a drag-bar and hinge, D Y.

The rake shown for discharging the grain from the platform is intended to represent the

table-rake; but any other sweep-rake—such as the Johnston or Dorsey type—may be used, in which the raking and gathering arms move around a vertical or nearly vertical shaft or pivot, the rakes moving the grain over the platform in the arc of a horizontal or nearly horizontal circle. At the inner side or end of this platform, where the grain is discharged, the binding-table F is located, said table being rigidly secured to the platform B, and being provided with a hinged compressor-board, G, and adjoining side board, T.

Upon the platform B, and at any suitable point between the cutters and the supplemental binding-table F, is placed the frame M, upon which is arranged the gearing to operate the binding mechanisms, in the following manner: The shaft C^3 is mounted horizontally thereon in suitable bearings, and in a line parallel with the main axis of the traction wheel or wheels, and upon the end of this shaft next to the platform B is rigidly secured the segmental gear N, which is provided with a wrist-pin, L″. Upon this pin is mounted the binding-arm K. The toothed portion of the segmental gear is alternately engaged with and disengaged from the horizontal sliding rack *d*, for the purpose hereinafter described.

The wheel P fits loosely upon the shaft C^3, and is provided with a ratchet-hub, and turns idly upon the shaft, except when engaged by the clutch R, in order to communicate motion to the shaft C^3, for the purpose hereinafter described. The clutch R is operated by the bell-crank lever S, which communicates with the projecting stud or pin *r*, as shown in Fig. 5. The bell-crank lever S is operated by the oscillating crank H″ and pin *h*′ in the manner shown in Fig. 6. The crank H″ is rigidly secured upon the end of shaft V′, which extends across on the under side of the platform, and communicates with the rake disk or lug P^6, (shown in Fig. 7,) which is so arranged as to trip the shaft V′ when a gavel has been placed upon the binding-table F by the rake. This tripping of shaft V′ causes the bell-crank lever S to release its hold upon the projecting stud or pin *r*, and the spring P‴ drives the clutch R, in gear with the idly-rotating wheel P. The clutch R is feathered upon the shaft C^3, and causes said shaft to revolve, and just at the termination of one revolution of the shaft C^3 the clutch is automatically drawn from the wheel P by the bell-crank lever S, the pin *r* striking against the inclined side of said lever, the end of which, being formed into a hook, as shown in Fig. 5, locks the shaft C^3.

Referring to the drawings, Fig. 3, *d* is a horizontal sliding rack, and upon its end next to the binding-table F is mounted semicircular compressor W, which is provided with an elastic yielding device, *b*, to compensate for different-sized gavels. The first cog of the rack next to the spring *b* is somewhat longer than the rest, (plainly shown in Fig. 4,) thereby making it a starting-cog, to engage with the toothed portion of the segment N, in the manner shown in Fig. 3.

The cogs of the rack and segment are of a corresponding and equal number, and when the disk N begins to revolve in the direction of the arrow it drives the rack forward, with its compressor W, to compress the gavel between said compressor and compressor-board G until said cogs have all terminated, at which moment the cam portion *n* of disk N comes in contact with the last cog of rack *d*, and thereby retains the gavel in its compressed condition until the tie of the band is completed. When the said cam passes off the cog the compressor is immediately drawn back by either the spring P^4 or supplemental vibrating bar O, which bar is pivoted thereto, and so arranged in relation to the roller P^1 on rake-table C, which has come in collision with the elongated projection J′, thereby driving back the said compressor W to its starting-point, to begin its operation upon the next gavel, at which moment the roller P^1 passes off the projection J^1.

K denotes the band carrying or binding arm, which extends entirely across the binding-table F from side to side, as shown in Fig. 4, and is preferably of a curved form, so as to form an arc of sufficient height over the binding-table to admit of an unbound gavel; but any other preferable form or shape of the arm may be used without departing from the spirit of my invention.

The object of so arranging the binding-arm is to hold the binding-cord at the far or rear side of the binding-table in a position preparatory for binding a gavel in the manner shown in Fig. 3, and thus allowing its support and operating mechanism to be located upon the platform at a suitable point between the cutters and the binding-table, thereby getting the greater part and weight of the binding mechanism close to the main supporting and driving wheels, which is very important for the successful working of the machinery. It also dispenses with the extra caster-wheel used to support the platform, and thereby lessens the draft of the machine.

The binding-arm K is mounted upon the wrist-pin L″ of segmental gear N, and has its rear end passed through the guide L, pivoted on an extended arm of frame M. When the segmental gear N begins to revolve in the direction of the arrow shown in Fig. 4 the compressor W moves forward, as before described. The curved end of the binding-arm with the binding-cord is raised upward, drawn back, and passed over the gavel and down by the side of the compressor W into the slot of the binding-table. In the meantime the tying mechanism A′ has also been drawn forward, carrying the end of the binding-cord with it, which now co-operates with the binding-arm, as shown in Fig. 4, in uniting the ends of the band in their backward movement, and at the moment the tie is completed the tying mech-

anism depresses the spring-latch X by bearing up upon the inner end of the latch, so as to release its hold upon the compressor-board G, which is then free to swing back while the binding-arm is in the act of pushing the bound gavel off the table F, as shown in Fig. 9.

The tying mechanism A′ again secures the end of the binding-cord, which forms the succeeding bands, and the binding-arm is raised, and finally comes to rest when in its extreme, or nearly so, backward stroke, through the shifting mechanism before described, holding the binding-cord in the shielding-kerf *g* of compressor-board G, as shown in Fig. 3.

The tying mechanism I prefer to employ is fully described in former patents granted to me; but any other preferable and suitable tying mechanism may readily be arranged to co-operate with the binding-arm, so as to hold the binding-cord in the shielding-kerf *g*, as above described, without departing from the spirit of my invention.

F is the supplemental platform or binding-table connected directly with the delivery end of the quadrant platform B, so as to receive the grain therefrom at right angles, or nearly so, to the line in which it falls upon the quadrant platform.

The binding-table is made, by preference, level with the quadrant-platform, and upon the side next to the main body of the machine is rigidly secured the side or fender board, T, which board is divided at a point in line with the transverse slot L^2 of binding-table F, so as to admit the compressor W to pass back out of the way when a gavel is being delivered upon the said binding-table. The end of said fender-board represented by T′ is connected to a similar board that is placed between the table-rake and binding mechanism at right angles with the board T. The corner at the union of these boards is rounded up to allow the straggling straws more readily to enter the general mass of grain as the rake sweeps the gavel upon the binding-table.

Hinged to the rear side of the binding-table, upon the rod or shaft *i*, is the compressor-board G, which is in line, or nearly so, with the circular fender-board of the quadrant platform B. It will be seen by this plan of construction or arrangement of the fender-board T and compressor-board G the binding-table is converted into a box form, thereby tending to nicely even up all the straggling straws, and keeping the gavel in a compact form until bound and dropped upon the ground. Pivoted to the under side of the binding-table is the spring-latch X, having its rear end projecting up through said table, so as to catch behind the compressor-board G. Said board is thereby securely locked until the gavel is bound, when the binding mechanism A′ will depress said spring-latch and unlock said compressor-board, which is then free to swing back to allow of dropping the gavel upon the ground.

So far no means have been described for imparting the necessary motion to the binding mechanism proper. Suitable provisions are, however, shown in Figs. 1 and 3 by which the chain Q is operated by a suitable wheel or the end of the main driving-axle, and passing over a similar wheel, P, of shaft C^3, which keeps said wheel P in constant motion while the machine is in operation.

It is obvious that other suitable arrangements for imparting the necessary motion to the shaft C^3 can readily be employed, or so modified as to adapt it to the different harvesters in use.

The rake C E may be driven from the main gearing of the machine in any suitable manner generally employed, as the rake is not my invention. The cog-wheels B′ B″ only are shown, whereby said rake may be operated.

Having described the action of the various details separately, the operation of the machine as a whole is as follows: As the machine advances, the cut grain falls upon the platform B. The table sweep-rake C E in its turn gathers the grain into a gavel and sweeps it upon the supplemental binding-table F in a proper position for binding. Having delivered the gavel, it trips the projecting end of the shaft V′ with the projection P^3, thereby setting in motion the entire binding mechanism in the manner before described. The compressor W now advances and compresses the gavel against the compressor-board G. At the same time the binding-arm K, with the binding-cord, is raised upward, brought over the gavel and down by the side of the compressor, carrying with its curved end the binding-cord through the slot of the binding-table into the tying mechanism A′, which has been brought forward by the connecting-rod and crank A″ A‴, (shown in Fig. 4,) carrying with it the end of the binding-cord until it meets with the binding-arm. The motion of the binding-arm and tying mechanism are so arranged that they now both travel back toward the rear end of the binding-table, and unite the ends of the band, which is tightly drawn around the compressed gavel. The knot being secured, the hinged compressor-board is now relieved in the manner hereinbefore described, and the binding-arm pushes the bound gavel off the table upon the ground, substantially in the manner shown in Fig. 9. A suitable spring, J, again closes the compressor-board, the binding-arm rises upward with its curved end to a point above the compressor-board, when it will become stationary through the automatic shifting mechanism before described. The tying mechanism A′ has also become stationary at the rear end, and, having secured the end of the binding-cord for the succeeding band, the binding-cord is thus held shielded in the kerf *g* of compressor-board G, substantially as shown in Fig. 3, thus leaving the binding mechanism ready to operate upon the next gavel as the rake delivers it, when the above-described operation will follow bundle after bundle.

In Fig. 10 the board is shown as being concave on its inner side instead of flat, so as to assist in rounding up the bundle.

The knot-tying mechanism here used is fully described and shown in my former patent, and is not therefore claimed or more fully described in this application.

Having thus described my invention, I claim—

1. In self-binding grain-harvesters, the combination, substantially as hereinbefore set forth, of a table-rake and quadrant platform, a slotted horizontal binding-table, a horizontal reciprocating compressor, a horizontal and vertical reciprocating binding-arm, and a supplementary hinged back or compressor board, for the purpose specified.

2. The combination of the quadrant platform, a rake arranged thereon, the binding mechanism, a supplemental binding-table upon which the grain is swept by the rake at right angles to the cutter-bar, the compressor and a compressor-board, and their mechanisms, the board being made to swing out of the way, so as to let the bundle drop on the ground, as shown.

3. The horizontally-moving compressor W, in combination with the segmental gear N, the rack being provided with the curved projection 1, and the gear having a corresponding plain surface to catch behind the projection, and thus lock the compressor in place, substantially as shown and described.

4. Combined with the quadrant platform and supplemental binding-table, a hinged compressor-board, arranged at the rear side of the binding-table, and in relation to the circular fender-board of the platform, for the purpose of guiding the straw or unbound gavel upon the binding-table, and operating as a compressor-board during the operation of binding the gavel.

5. The combination, substantially as hereinbefore set forth, of a quadrant platform, sweep-rake, horizontal and vertical reciprocating binding-arm, horizontal reciprocating compressor, shifting-clutch R, bell-crank lever S, and crank-shaft V′, the whole arranged to operate substantially as shown and described.

6. Combined with the supplemental binding-table F and hinged compressor-board G, a reciprocating tying mechanism adapted to operate in combination with the binding-arm to hold the binding-cord in the shielding kerf of the compressor-board, substantially as shown and described.

7. Combined with the quadrant platform and table sweep-rake, the pivoted cam-bar O, adapted to drive back the compressor W, in the manner as and for the purpose specified.

8. The combination, with the quadrant platform, supplemental slotted binding-table, and binding-arm, of a reciprocating tying mechanism, arranged to operate, in combination with the binding-arm, in securing the band around the gavel, substantially as shown and described.

9. The binding-arm K, arranged to extend across and above the binding-table, as shown, for the purpose of holding the binding-cord in the shielding-kerf *g* of compressor-board G, for the purpose set forth.

10. The binding-arm K, arranged to bring the binding-cord from the compressor-board G over the gavel and down on the same side as the compressor W, substantially in the manner shown and described.

11. The combination of the horizontal reciprocating compressor W and the binding mechanism and their operating mechanisms, arranged upon the quadrant platform between the cutters and the driving-power, whereby the compressor is made to always move with the binding mechanism, as set forth.

12. The combination, substantially as herein shown and described, of a quadrant platform, supplemental binding-table, hinged compressor-board G, reciprocating compressor W, reciprocating tying mechanism A′, horizontal and vertical reciprocating binding-arm, cord-spool U, and tension *h f*, for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 13th day of September, 1878.

MOSES A. KELLER.

Witnesses:
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W. J. ENGLEBECK.