(No Model.) 5 Sheets—Sheet 1.

H. TUTTLE.

STRAW BAND GRAIN BINDER.

No. 547,697. Patented Oct. 8, 1895.

Fig. 4.

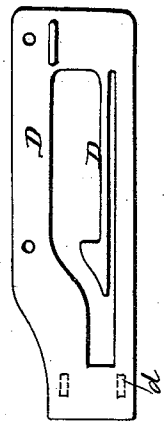

Fig. 5.

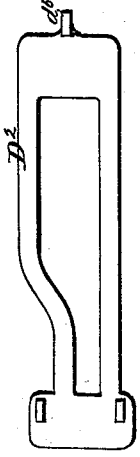

Fig. 1.

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H. TUTTLE.

STRAW BAND GRAIN BINDER.

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Fig. 2.

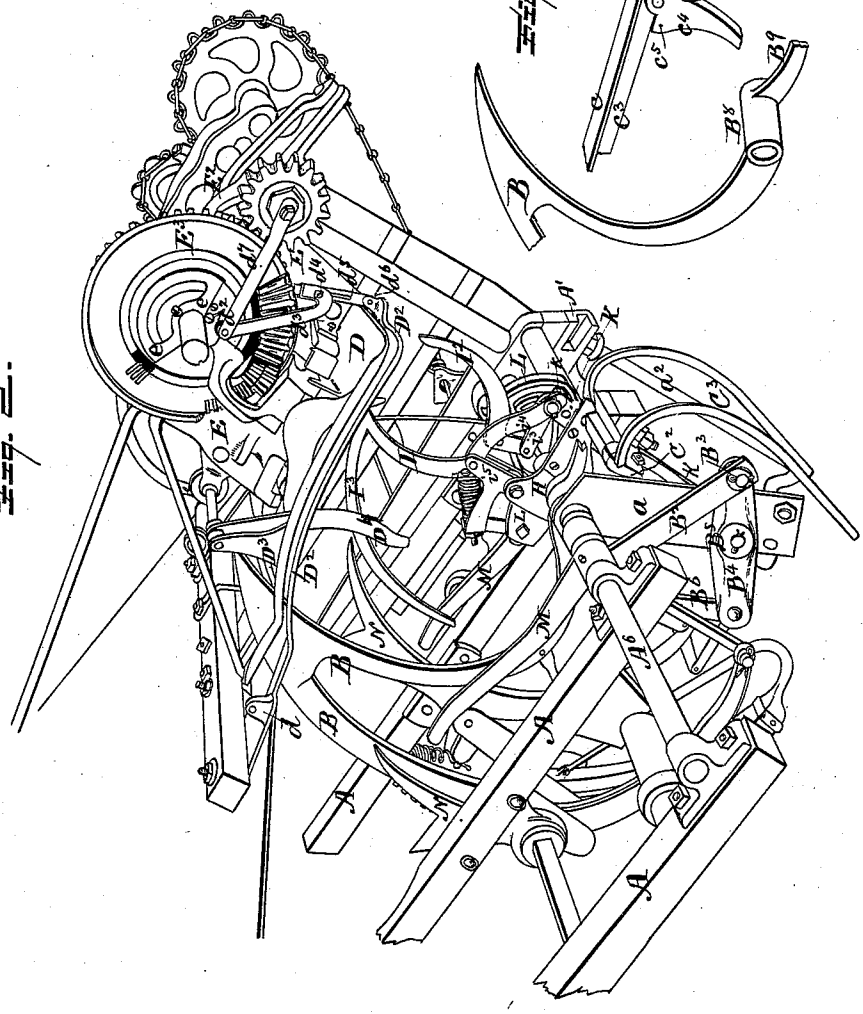

Fig. 2 D.

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STRAW BAND GRAIN BINDER.

No. 547,697. Patented Oct. 8, 1895.

Fig. 3.

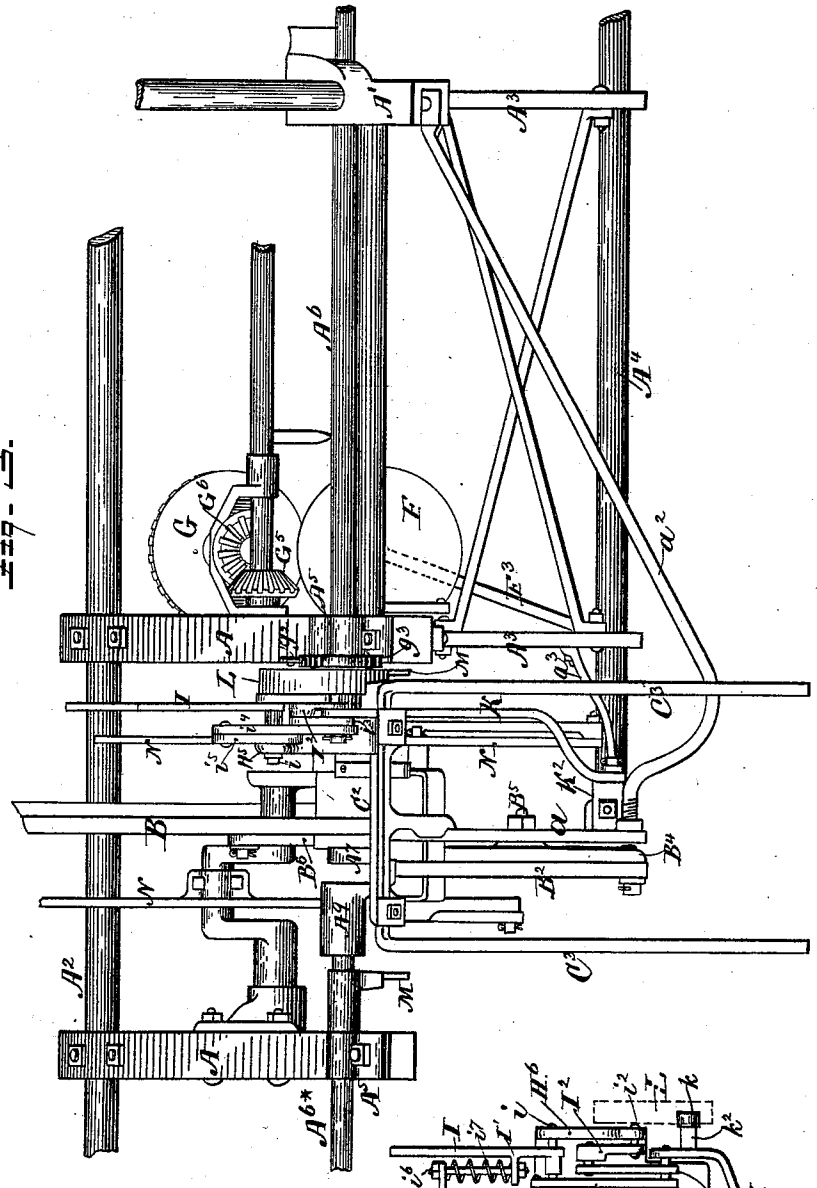
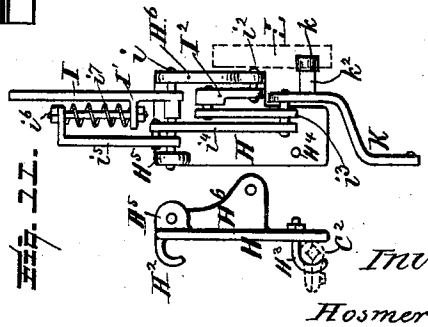


Fig. 22.



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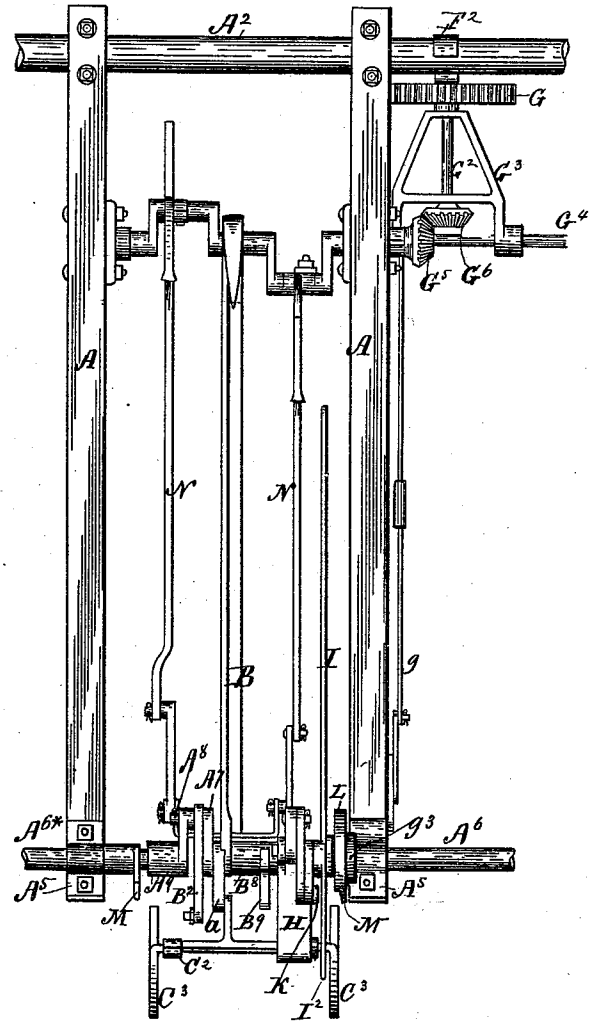
STRAW BAND GRAIN BINDER.

No. 547,697. Patented Oct. 8, 1895.

Fig. 4.



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H. TUTTLE.

STRAW BAND GRAIN BINDER.

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Fig. 7.

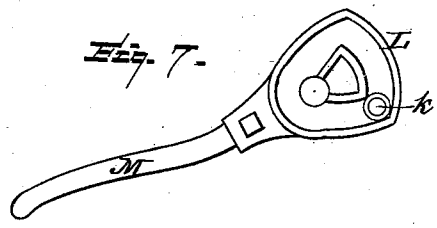
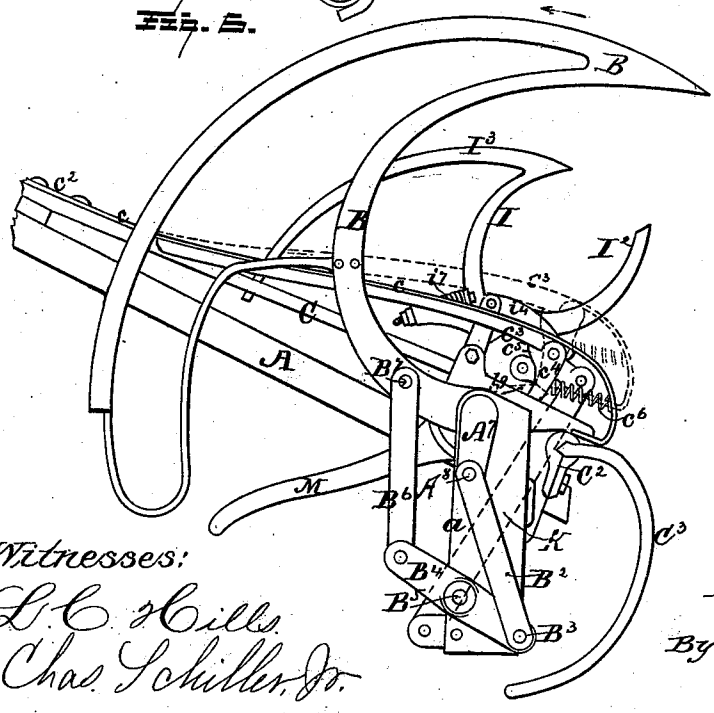


Fig. 5.

Fig. 6.



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UNITED STATES PATENT OFFICE.

HOSMER TUTTLE, OF CEDAR RAPIDS, IOWA.

STRAW-BAND GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 547,697, dated October 8, 1895.

Application filed September 18, 1889. Serial No. 324,330. (No model.)

To all whom it may concern:

Be it known that I, HOSMER TUTTLE, a citizen of the United States, residing at Cedar Rapids, in the county of Linn, State of Iowa, have invented certain new and useful Improvements in Straw-Band Grain-Binders, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in straw-band grain-binding machines; and the objects of my improvement are to produce a simple and effective mechanism for operating the needle; also, to provide simple means for operating the two jaws of the compressor, and means to operate the bundle-dischargers mounted on the needle-shaft. I attain these objects by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of the mechanism constructed in accordance with my invention, said mechanism being shown mounted upon the lower end of the grain-binder sills with the needle at the lower end of its course and the table removed to show the parts under it. Fig. 2 is a similar perspective view with the needle receding from its highest point. Fig. 3 is an outside elevation of the same. Fig. 4 is a top view of the same. Fig. 5 is a side view of one of the sills and mechanism attached thereto to give slack to the straw-band at the time the needle is passing around the gavel. Fig. 6 is a side view of one of the sills, the needle and operating mechanism, the bundle-elevator, the compressor, and the discharger. Fig. 7 is a side view of one of the dischargers and its cam, with a roller therein. Fig. 8 is a top view of the upper or stationary breast-plate. Fig. 9 is a top view of the lower or hinged breast-plate. Fig. 10 is a perspective view of the pivoted portion of the needle and of the outer end of the bundle-elevating strip and its latch, located above the latch-elevating arm on the sleeve of the needle. Fig. 11 is a diagram top view of the compressors and their operating rods and levers spread apart to clearly show their pivots. It also shows the supporting-casting in top view and side view.

In said drawings, A represents the inclined sills used to support the grain binding and discharging mechanism. Said sills have their upper ends supported by a tubular bar A^2, secured, as usual, to a harvester-frame, and their lower ends by legs A^3, braced together and resting upon another tubular bar A^4, carried also by the harvester. On the lower end of the sills is mounted in suitable bearings A^5 the shaft A^6, carrying the needle B. Said shaft has a crank-arm A^7, Fig. 6, provided with a crank-pin A^8, the end of which enters a crank-arm A^9, attached to a shaft A^{6*}, which thus substantially forms a continuation of the shaft A^6, and has its bearing A^5 on the end of one of the sills A.

To operate the needle, the crank-pin a^8 has journaled thereon one end of a connecting-rod B^2, the opposite end of which is pivoted at B^3, Fig. 6, to one end of a walking-beam lever B^4, pivoted at B^5 to a pendent support a. To the opposite end and side of the lever B^4 is pivoted one end of a connecting-rod B^6, having its opposite end pivoted at B^7 to the body of the needle a short distance from its pivot-sleeve B^8. The support a has its upper end carried by the shaft A^6 alongside of the needle, and it is retained immovable by means of a brace a^2, having its lower end secured to the lower end of said support a and its upper end secured to a casting A′, forming a continuation of one of the sills A. The support a is additionally secured by means of a brace a^3, Fig. 3, having one end attached to one of the legs A^3.

The advantages obtained by the needle-operating mechanism above described are that said needle is driven with but little strain on the shaft carrying the needle and the needle-shaft is permitted to make complete revolutions, drive the compressors, and carry the dischargers thereon. Furthermore, while the end of the crank-arm A^7 descends there is a tendency to lift the heel of said crank and its shaft at that point, and said tendency is counteracted by the support a, which presses said shaft down by means of the connecting-rod B^2 and lever B^4, thus having these two pressures well balanced. Furthermore, the needle is substantially in line with its operating-crank and the dischargers on each side thereof.

To provide means to elevate the bundle

about two inches at the time the band is tucked in, I provide a strip of springy sheet metal *c*, about one or two inches wide, having one end secured at c^2 to the table C, Fig. 6, of the binder. The outer end of said strip is bent under and normally rests upon the casting C^2, that holds the stationary bundle-strippers C^3, said casting being secured to the inner side of the support *a*. The strip *c* is along one side of the path traveled by the needle. A strip *c* may be placed along each side of said path. It is provided with a rib c^3 on the under side thereof to stiffen its middle portion and prevent it from bending under the weight of a bundle. To elevate the strip *c*, a latch c^4 is pivoted to the outer end of the rib c^3 and has a lip c^5 to engage under the rib c^3 and prevent it from being folded under said rib; but it is free to swing outwardly, being controlled only by a spring c^6, pressing against its outer edge, the opposite end of the spring bearing against the inner side of the strip *c*. Said strip and latch are elevated together by means of an arm B^9, projecting radially from the sleeve of the needle, the end of said arm pressing in engagement with the free end of the latch.

The breast-plate consists of an upper plate D and a lower plate D^2. The plate D is stationary and is supported by the casting E, and the latter is carried by the U-shaped frame E^2, these parts being substantially similar to that shown in the pending application, Serial No. 278,715.

To hold the bundle a sufficient distance from the knotter while the needle-arm is passing the band around the bundle to allow a sufficient amount of slack on the band to make the knot, the lower plate D^2 is used. Said plate is hinged at its inner end to lugs under the plate D at *d* and is longitudinally slotted for the passage of the needle. The outer end of the plate D^2 is controlled by the bundle to elevate it during the knotting operation and by a roller d^2 to, afterward positively depress it in traveling against the periphery of a cam *e*, projecting from the face of the mutilated gear E^3, which controls all the movements of the knotting mechanism. The roller d^2 is at the end of a connecting-rod d^3, that has its lower end adjustably connected by means of a nut d^4 with slotted link d^5 that has its lower end hinged to a lug d^6, projecting from the outer end of the plate D^2. When the latter is not elevated by the bundle, it drops by its own weight until the bend in the connecting-rod d^3 rests upon the plate D, as the cam *e* is simply a cam operating by its outer periphery. The roller d^2 is retained in proper relation with the cam by means of a brace d^7, having its outer end secured upon the end of one of the operating-shafts. Upon the plate D is pivoted to a lug D^8 one end of the trip-shaft and the trip-lever D^4, of ordinary construction.

To bring the band-slack to the needle during the upward and forward movement of the needle to place the band around the bundle, there is placed in the path of the band a flanged roller F, Fig. 5, the journal of which is supported by a strap F^2, suspended from the tubular frame A^2 of the harvester, and a brace F^3, connected with one of the legs A^3. Over the flanged roller F is placed a corrugated wheel G, mounted upon a shaft G^2, Fig. 4, journaled into a forked frame G^3, which is hinged upon the packer-shaft G^4, and upon said shaft is mounted a bevel-pinion G^5, which meshes with a bevel-pinion G^6 upon the shaft G^2 and gives to the latter a constant rotary motion; but the free end of the frame G^3 and its corrugated wheel G are normally retained elevated, and the latter away from the roller F, by the spiral spring G^7; but at the time that the needle starts the wheel G is pressed against the roller F. This is automatically accomplished by means of a crank-arm G^8, pendent from one of the hinge-lugs of the frame G^3. This arm G^8 is adjustably connected by means of an extension connecting-rod *g* with one end of a lever g^2, journaled in a bearing attached to the bottom of one of the sills A, and the opposite end of said lever g^2 bears against a cam g^3, mounted upon the needle-shaft, so that when the corrugated wheel G is bearing upon the band it will advance enough of the band to supply the needle with a slack band during its upward movement, and when the needle has reached the end of its forward course the lever g^2 will become disengaged from the cam g^3, the spring g^7 will elevate the wheel G, and permit the packed bundle to take the necessary length of band.

To keep the bundle compressed during the whole length of time engaged in tying the band, and thus relieve the band and its ends from pressure while they are being twisted and until they are nearly tucked, a compressor consisting of an inner and outer jaw is used, and said jaws are pivoted to a casting H, that has its inner end resting upon the needle-shaft and its outer end resting on the casting C^2, that retains the bundle-strippers C^3. To retain the casting H immovable upon its supports, the inner end of said casting has pendent lugs H^2, in the form of hooks, that loosely embrace the needle-shaft, and near the outer end a bolt H^3, having one end in the form of a hook, has its hooked portion made to engage with the under side of the casting C^2, while its upper end passes through a bolt-hole H^4 in the casting H and is retained by a nut upon said casting. To provide bearings for the pivots of the jaws, the casting H has two lugs on its top surface, the small lug H^5 being at one corner and the longer and higher lug H^6, Fig. 11, being along the opposite side of said casting. The compressor consists of the inner jaw I and the outer jaw I^2. The inner jaw has its lower end pivoted to the casting H by means of a pin *i*, having its ends retained in the lugs H^5 H^6;

but the outer jaw has its pivot-pin i^2 some distance from its lower end, and said pivot-pin is secured in the highest portion of the lug H^6. The jaws are operated from the upper end of a lever K, that is bent laterally and has its lower end pivoted to a lug K^2, Fig. 3, projecting laterally from the pendent support *a*. To control the upper end of the lever K, it has a roller *k*, mounted upon a pin k^2, Fig. 11, projecting from its side. Said roller travels in and is controlled by a cam L, mounted upon the needle-shaft. The upper end of the lever K is connected with the lower end of the extension of the jaw I^2 by the connecting-rod i^3; but the upper end of the lever K is yieldingly connected with the jaw I at a point higher than its pivot *i*, so as to render said jaw yielding to receive and operate upon bundles of different sizes. To that purpose, there is also pivoted to the upper end of the lever K a connecting-rod i^4, that unites it to one arm of a bell-crank lever i^5, and said lever is pivoted to the lugs of the casting H by means of the pivoted rod *i*. The other arm of the bell-crank lever has its free end bent laterally toward the jaw I and is yieldingly connected thereto by means of a bolt i^6, passing loosely through said bent end and through a lug I′, projecting laterally from the jaw I, and a spring i^7, placed upon the bolt i^6 and having one of its ends pressing against the bent end of the bell-crank lever and the other end against the lug I′. The inner jaw I has a tail or guard I^3 extending from its point to arrest the grain and prevent it from lodging under the jaw I during the operation for opening it while the previously made and tied bundle is discharged.

The dischargers consist of arms M, mounted upon the needle-shaft, one of them in this case projecting from a sleeve and the other from the cam L upon said shaft.

The device is also provided with packers N of ordinary construction.

Having now fully described my invention, I claim—

1. The combination of a grain binder table, a needle loosely mounted on its supporting pivot-shaft under said table, and a crank upon said shaft, a support *a* on said shaft between said needle and crank, a walking-beam lever pivoted to said support, a connecting rod uniting one end of said lever to the crank on the needle supporting shaft, and a connecting rod uniting the opposite end of said lever to the body of the needle, substantially as described.

2. The combination of a grain binder table, a needle loosely mounted on its supporting pivot shaft under said table, a crank upon said shaft, a support alongside of said needle, a lever B^4 centrally pivoted to said support, a connecting rod uniting one end of said lever to the crank on the needle supporting shaft and a connecting rod uniting the opposite end of the lever with the needle substantially as described.

3. The combination of a grain binder table, a needle loosely mounted on its supporting pivot shaft under said table, a crank and dischargers upon said shaft, a support alongside of said needle, a lever B^4 centrally pivoted to said support, a connecting rod uniting one end of said lever to the crank on the needle-supporting shaft and a connecting rod uniting the opposite end of the lever with the needle substantially as described.

4. The combination of a grain binder table, a needle loosely mounted on its supporting pivot-shaft under said table, and an arm B^9 connected with said needle, with a bundle elevator having its inner end flexibly connected to the table and a latch attached to its outer end, substantially as and for the purpose described.

5. The combination of a grain binder table, a needle loosely mounted on its supporting pivot-shaft under said table and an arm B^9 projecting from the sleeve of the needle, with a bundle elevator having its inner end flexibly retained, a latch pivotally attached to the outer end of the elevator and a spring pressing against said latch, substantially as and for the purpose described.

6. The combination of a grain binder table, a needle loosely mounted on its supporting pivot shaft under said table, the U shaped frame, the knotter operating shaft and cam *e* upon said shaft, the stationary breast plate D, and under said breast plate the movable breast plate D^2 having its inner end hinged and its outer end connected with said cam *e*, substantially as described.

7. The combination of a grain binder table, a needle loosely mounted on its supporting pivot shaft under said table and a cam g^3 upon said shaft, a pivoted lever g^2 having one end bearing against said cam and the other end connected with the support of the wheel G, with a roller F suspended under the table and a corrugated wheel G over said roller, a spring yieldingly supporting one end of the shaft of the wheel G, substantially as and for the purpose described.

8. The combination of a grain binder table, a needle loosely mounted on its supporting pivot shaft under said table and a compressor having two hinged jaws facing each other, substantially as described.

9. The combination of a grain binder table, and a compressor having an inner jaw and an outer jaw hinged to their support and facing each other, the inner jaw being provided with a tail I^3 extending inwardly, substantially as and for the purpose described.

10. The combination of a grain binder table, a needle loosely mounted on its supporting pivot shaft under said table, an outer compressor jaw I^2 hinged to its support at a point

between its two ends, a hinged lever, K, its roller *k* and cam L upon the needle shaft with the inner compressor jaw I pivoted to its support at its lower end and yieldingly sustained, substantially as described.

11. The combination of a grain binder table, a needle loosely mounted on its supporting pivot shaft under said table, a crank and dischargers upon said shaft, the operating mechanism of the crank shaft as described, a support alongside of said needle, a casting C^2 attached to said support and bundle strippers C^3 secured to said casting substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

HOSMER TUTTLE.

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