

(No Model.)

3 Sheets—Sheet 1.

M. KANE.
GRAIN BINDER.

No. 467,467.

Patented Jan. 19, 1892.

Fig. 2.

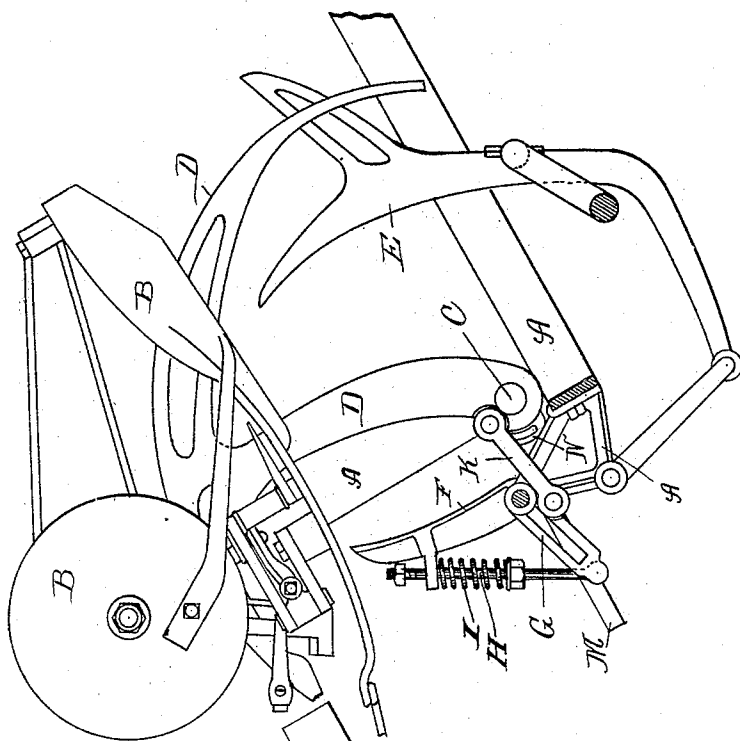
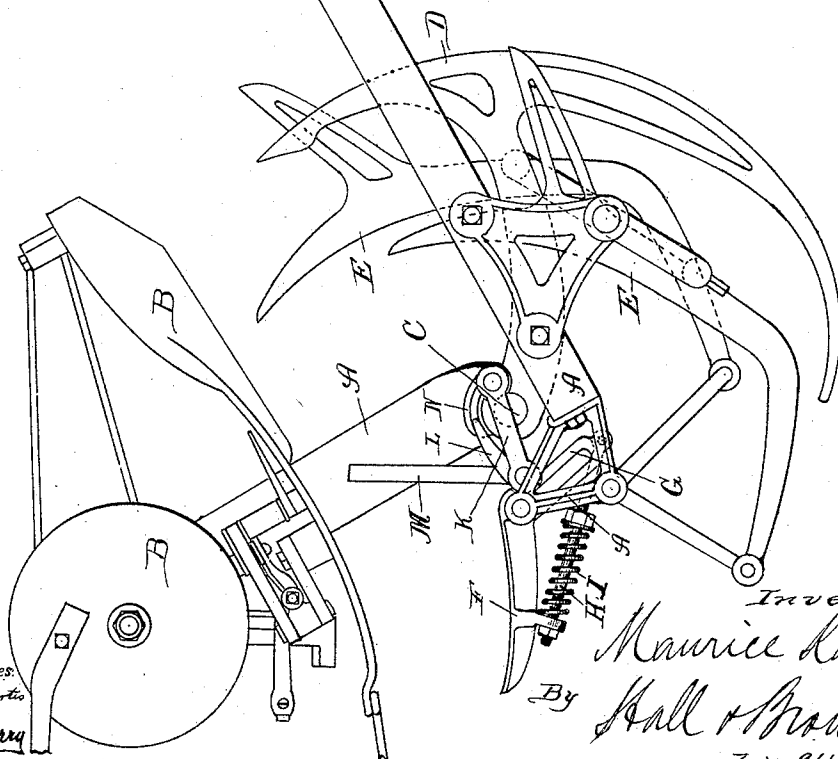


Fig. 1.



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His Attorneys.

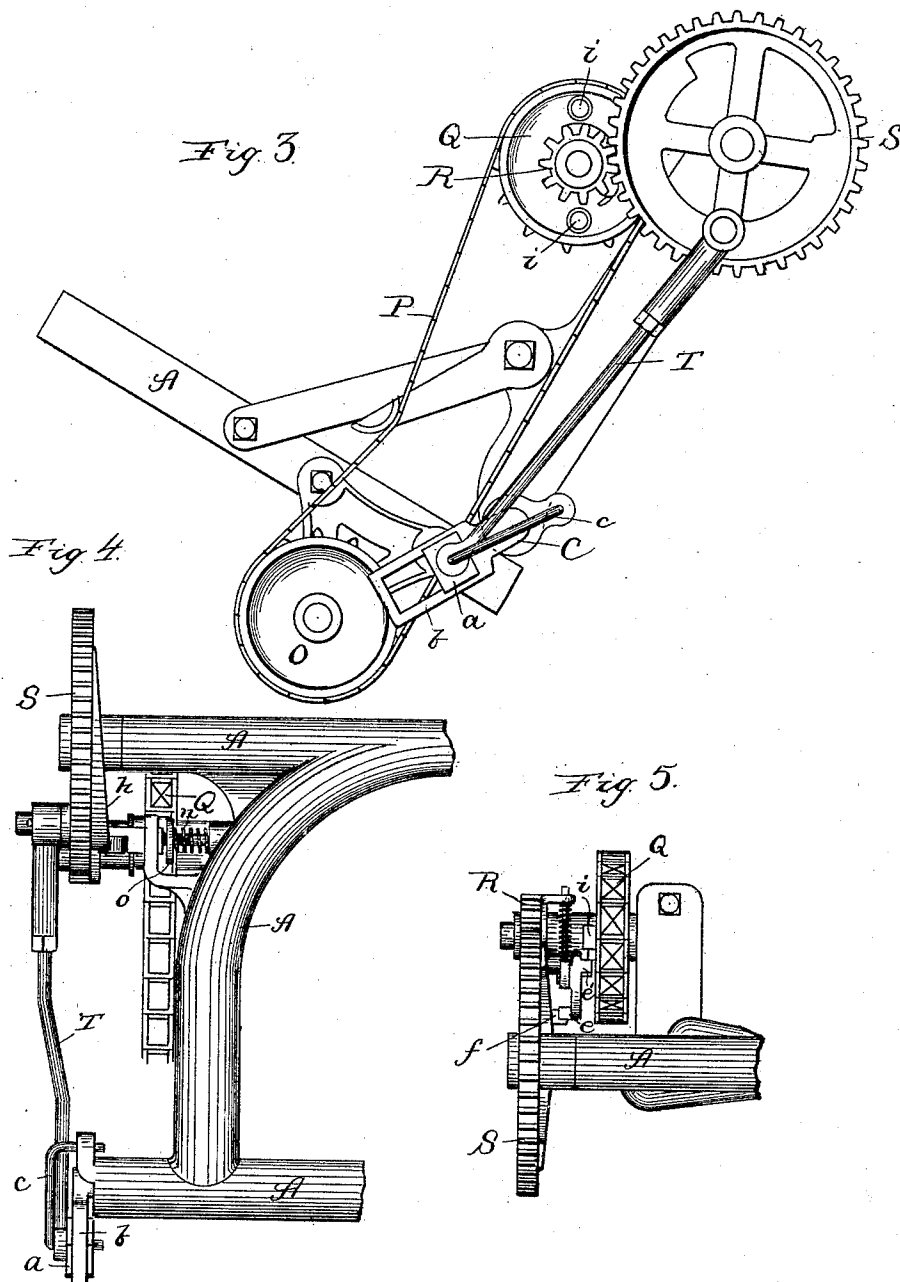
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3 Sheets—Sheet 2.

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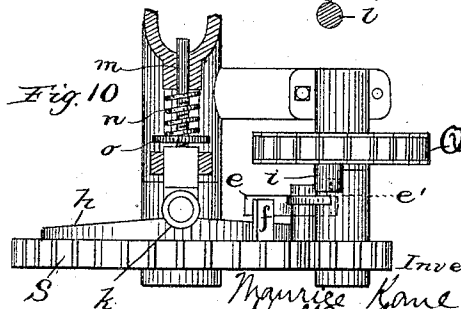
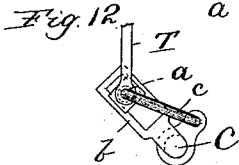
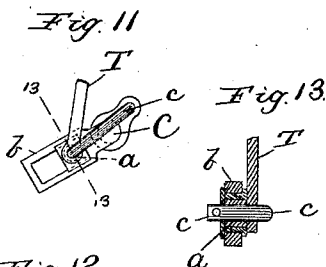
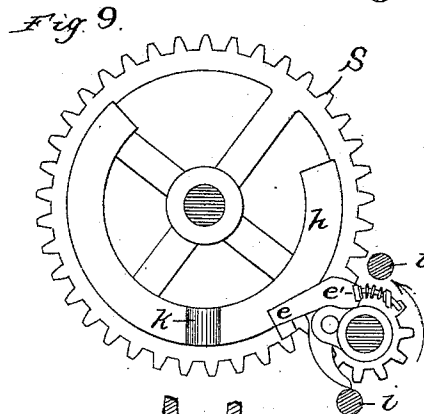
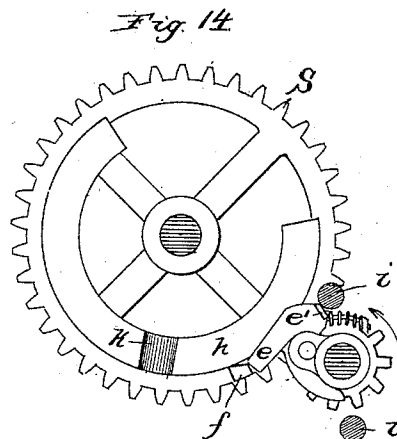
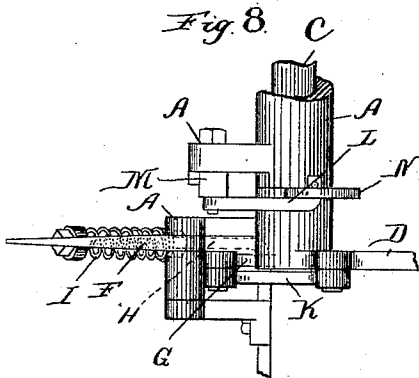
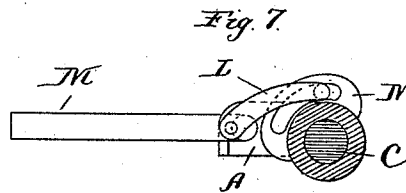
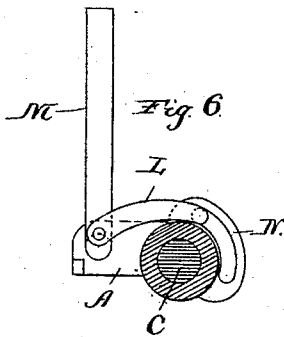
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M. KANE.
GRAIN BINDER.

No. 467,467.

Patented Jan. 19, 1892.



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UNITED STATES PATENT OFFICE.

MAURICE KANE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WARDER, BUSH-
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GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 467,467, dated January 19, 1892.

Application filed June 2, 1891. Serial No. 394,849. (No model.)

To all whom it may concern:

Be it known that I, MAURICE KANE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Grain-Binders, of which the following is a specification.

This invention relates to grain-binders, and its object is to simplify and render more efficient this class of machines.

The invention consists in the construction and arrangement hereinafter described and claimed.

Like letters refer to the same parts in the several figures of the drawings, in which—

Figure 1 is a side elevation of a portion of a grain-binder with the compressing-finger depressed to permit the bundle to be discharged. Fig. 2 is a similar view, except that the compressing-finger is here shown in position for action. Fig. 3 is a side elevation of the gearing for actuating the shafts of the knotter, the packers, and the needle, and the connecting devices between such gearing. Fig. 4 is a rear view of the parts represented in Fig. 3. Fig. 5 is a detail view, in front elevation, of the gear on the knotter-shaft and the devices for clutching the same. Figs. 6 and 7 are detail views, partly in section, of the trip-arm and its connection with the needle-arm. Fig. 8 is a top view of the arrangement of the trip-arm and compressing-finger with reference to each other and the adjacent mechanism. Fig. 9 is an inside view, in side elevation and partly in section, of the gear on the knotter-shaft, the pinion meshing therewith, and the clutching devices. Fig. 10 is a top view of the same devices, together with the retarding device. Figs. 11 and 12 are detail views of the crank for driving the needle-shaft, showing said crank in different positions, and the sliding box for the pitman also in different positions in a slot in the crank. Fig. 13 is a detail sectional view of the sliding box, the pitman, and the governing arm or rod. Fig. 14 is a view similar to Fig. 9, except that the gears are in such position that the lug *e'* is in engagement with the pin *i*.

Such parts of the frame of the grain-binder as are shown in the drawings are designated by the letter A.

The upper parts of Figs. 1 and 2 of the drawings illustrate a knotting mechanism, and these are designated by the letter B; but as they are of a common construction and form no part of the present invention they need not be further described.

A shaft C, suitably journaled in the frame, has keyed upon it a needle D, which is also of an ordinary and well-known form. Packer-arms EE, likewise of usual shape, are suitably mounted and actuated. A compressing-finger F is pivoted to the frame of the machine at a point forward of the shaft of the needle.

On the same axis with the compressing-finger, but independently thereof, is pivoted the bar G, the lower end of which is pivoted to a rod H, the other end of the latter being secured to a lug on the rear face of the compressing-finger. The rod is made to pass through the lug, and a nut is screwed to the outer end of such rod, whereby its position may be adjusted. A spiral spring I encircles the rod and is placed between the lug on the compressing-finger and a nut and washer secured at an intermediate point on the rod. By this construction the connection between the compressing-finger and the bar G is elastic and adjustable. A link K has one end pivoted to the bar or an offset thereon at a point adjacent to the connection of the bar with the compressing-finger, and has its other end jointed to the front side of the needle-arm at a point adjacent to the shaft C thereof. In consequence of this connection between the compressing-finger and the needle-arm, when the latter rises and begins to press against the bundle the former is also forced upward and caused to press against the other side of such bundle, and, on the other hand, as soon as the needle-bar descends the compressing-finger is drawn backward and downward and assumes the position shown in Fig. 1, so that it will not interfere with the discharge of the bundle. The movements of the compressing-finger and the needle-arm are thus caused to be simultaneous by a positive

and simple arrangement, and all locking and unlocking devices for the former are dispensed with.

The needle-arm is provided with a slotted flange N, located above its axis or shaft, and in the slot thus formed plays the bent end of a link L, the other end of which is pivoted to the lower end of a trip-arm M, which latter is pivoted in the frame in front of the shaft C. The grain to form a bundle is piled in front of this trip-arm, and when a sufficient quantity has been supplied the pressure caused thereby and by the packer-arms against the same forces such trip-arm downward from the position shown in Fig. 6, and the hooked end of the link bearing in the end of the slot in the flange of the needle-arm causes such arm and its shaft to turn, and through a crank and pitman connection starts the rotation of the gear-wheel on the knotter driving-shaft, and thereby causes the engagement therewith of a clutch connected with the main driving mechanism, all as will hereinafter be more particularly described. The further rotation of the shaft C causes the hooked end of the link L to slide to the other end of the slot in the flange N, and then the link is moved by said flange and causes the trip-arm to assume the position shown in Fig. 7 of the drawings.

The sprocket-wheel O is secured to the continuously-rotating packer-shaft, and through a chain P communicates such motion to a sprocket-wheel Q, which latter is loosely mounted upon a short axis projecting from the frame. A pinion R is loosely mounted upon the short shaft just referred to, and such pinion meshes with a larger gear S, which latter is keyed to the knotter driving-shaft. A pitman T is pivoted at one end to the gear S and at the other to a sliding box *a*, which moves in ways formed in the crank-arm *b*, secured to the needle-shaft C. The needle-shaft and the pivotal point for the pitman on the gear S are in different vertical planes, so that when the former receives its initial movement by means of the trip-arm before mentioned the consequent thrust of the pitman will be at an angle to the axis of the wheel, and will therefore rotate such wheel.

A rod *c* has both its ends bent, one of them to enter a bearing in the main frame at a point above and to outside of the shaft C and the other to pass through the lower end of the pitman and the sliding box and be secured so as to make such parts serve as a bearing. This bent rod insures the sliding of the box outwardly in the crank-arm as the latter turns in an upward direction, because in that operation the crank-arm approaches the axis of the rod which turns in the frame, and, on the other hand, in the downward rotation of such arm the sliding box is drawn inwardly by the bent rod. The effect of the box sliding outwardly in the manner stated is to cause the pitman to exert its force upon the crank-arm with an increasing leverage,

because such arm is thus virtually lengthened, and consequently the power is increased at the time the needle is compressing the bundle when additional power is most required.

As before mentioned, the sprocket-wheel Q is loosely mounted upon a short shaft and is secured to revolve continuously by its connection with the packer-shaft, and the pinion R is loose upon this same short shaft; but the pinion has pivoted to it a spring-acted dog *d*, carrying upon its opposite sides lugs *e e'*, which serve, respectively, to unclutch and clutch the pinion to the rotating sprocket, as will now be described. Normally the lug *e'* is out of engagement with pins or rollers *i i*, arranged upon the side of the sprocket-wheel Q, and the lug *e* is in contact with a lug *f*, arranged upon a side of the gear S; but when a slight rotation is given to the latter by the action of the bundle upon the trip-arm, as heretofore described, then the lug *f* is withdrawn from contact with the lug *e* and the dog *d* is turned by its spring until the lug *e'* is in the path of the pins *i i*, and therefore as the sprocket bearing such pins revolves one of them strikes the lug *e'* and turns the pinion, and the latter turns the gear and drives the knotting mechanism. As the gear finishes a complete revolution, it brings the lug *f* again in position under the lug *e* of the dog and causes the lug *e'* to become disengaged from the pins *i i* on the sprocket, and therefore the pinion and gear cease rotating.

I am well aware that clutching devices for a similar purpose are well known; but I have changed the arrangement of such devices so as to make them be carried directly by the gears, and have also simplified their construction. In actual practice I have found the present arrangement economical and very effective.

Another feature of the present invention will now be described. On the inside of the gear S is formed a ledge *h*, which is provided with a recess *k*, preferably of concave form. A bolt *m* has a horizontal bearing in the main frame and is preferably provided with a roller adapted to fit the concave depression or recess *k* in the ledge *h*. Encircling this bolt is a spiral spring *n* and a nut *o*, whereby the force with which the roller presses may be regulated. The locking or retarding device just described performs several functions. It serves to regulate the size of the bundle by determining the force which must be employed to trip the arm against which the bundle presses, because, as before explained, when the trip-arm is moved through the medium of the needle-shaft and pitman it gives an initial movement to the gear, and the greater the retardation of the movement of such gear by the spring-acted bolt or locking mechanism the larger bundle must it take to trip the arm. This locking or retarding mechanism also serves to prevent the momentum of the gear from carrying it beyond a complete revolution, and it hinders any back-

ward movement of such gear. Furthermore, after the pins or rollers on the sprocket have released the clutching mechanism on the pinion the gear has not been carried quite far enough, and at this time the roller in the plunger of the retarding mechanism bears on the edge of the recess and is caused by its spring-pressure to pass into such recess, and in so doing to turn the gear into its normal position of rest.

It is obvious that persons skilled in the art might vary the details of the invention herein described without departing from the principles thereof, and I do not wish to be understood as limiting myself to the exact construction shown and described.

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

1. In a grain-binder, the combination, with a needle, a compressing-finger, and a bar pivoted independently of the compressing-finger, but having an elastic connection therewith, of a link pivoted to the bar and to the needle, substantially as and for the purpose set forth.

2. In a grain-binder, the combination, with a trip-arm and a needle-bar provided with a slotted flange, of a hooked link connecting said arm and flange, substantially as and for the purpose set forth.

3. In a grain-binder, the combination, with a trip-arm, a needle-bar provided with a slotted flange, a hooked link pivoted to the trip-arm and having its hooked end playing in the slot of the flange, a shaft for the needle-bar, and a connection between said shaft and a gear-wheel, such gear-wheel being on the knotter driving-shaft, of a constantly-rotating driving-shaft and clutching devices between the same and the gear on the knotter driving-shaft, and mechanism for thrusting said clutching devices in and out of engagement

with such gear, substantially as and for the purpose set forth.

4. In a grain-binder, the combination, with a gear on the knotter driving-shaft provided with a restraining-lug, another gear adjacent to and meshing therewith and carrying a clutching mechanism normally held out of action by such restraining-lug, and a wheel positively connected with the main driving-shaft, but normally out of clutch with the last-mentioned gear, of a trip-arm and devices connecting the same with the gear on the knotter driving-shaft, whereby the movement of the trip-arm will give an initial movement to such gear, which will release the clutching mechanism and connect the main driving-shaft with the knotting mechanism, substantially as and for the purpose set forth.

5. In a grain-binder, the combination of a needle-shaft having a crank upon its outer end and a sliding box mounted therein, of a knotter driving-shaft, a pitman pivotally connected to the latter and to the sliding box, and a controlling-rod pivoted to the frame and to such sliding box, substantially as and for the purpose set forth.

6. In a grain-binder, the combination of continuously-rotating main driving mechanism, a knotting driving mechanism normally disconnected therefrom, clutching devices for periodically connecting the knotting driving mechanism and the main driving mechanism, a needle-shaft and connections from the latter through the gear on the knotter driving-shaft to said clutching mechanism, a trip-arm connected to the needle-shaft, and an adjustable retarding mechanism, substantially as and for the purpose set forth.

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