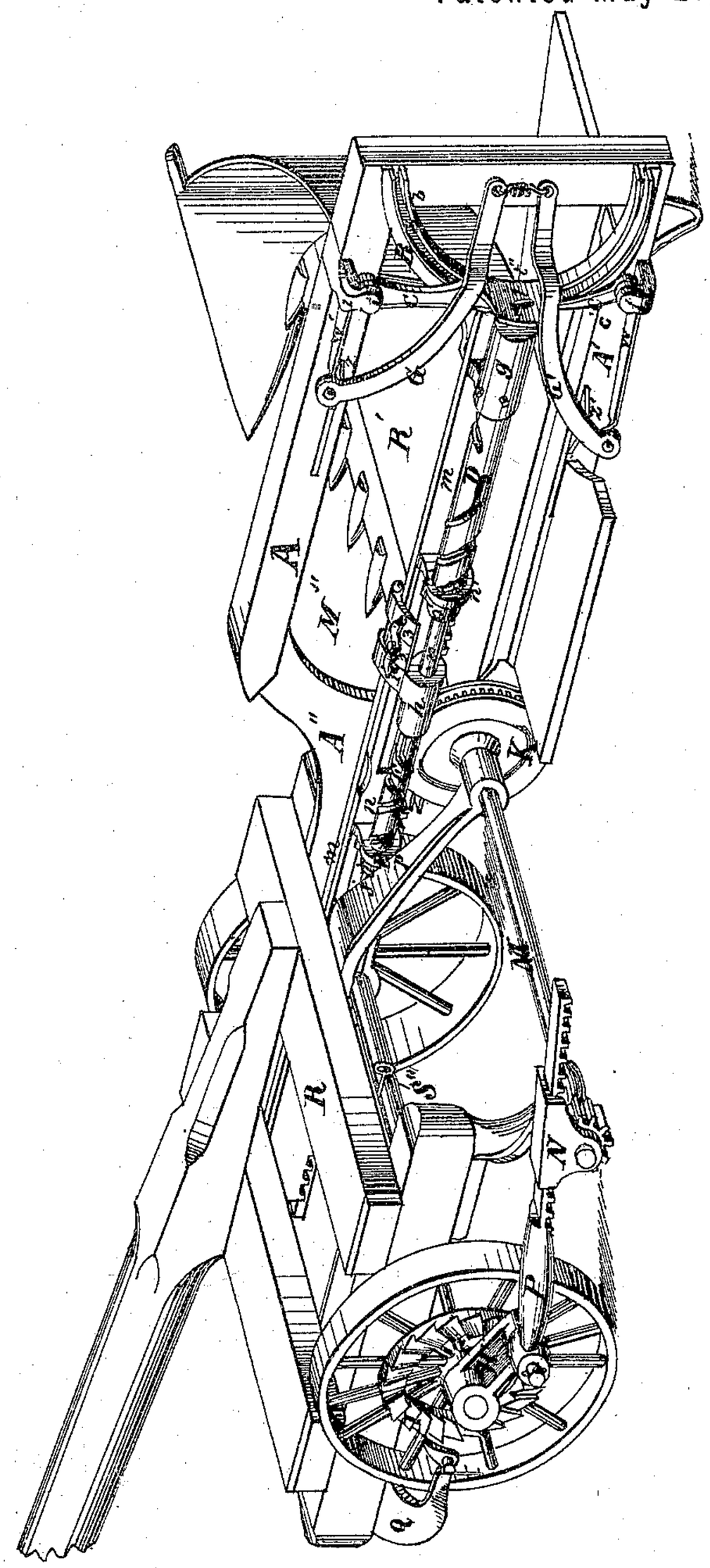
3 Sheets--Sheet 1.

NELSON B. FASSETT.

Grain-Binder.

No. 127,036. Patented May 21, 1872.

FIG. 1.



ATTEST

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FIG 4.

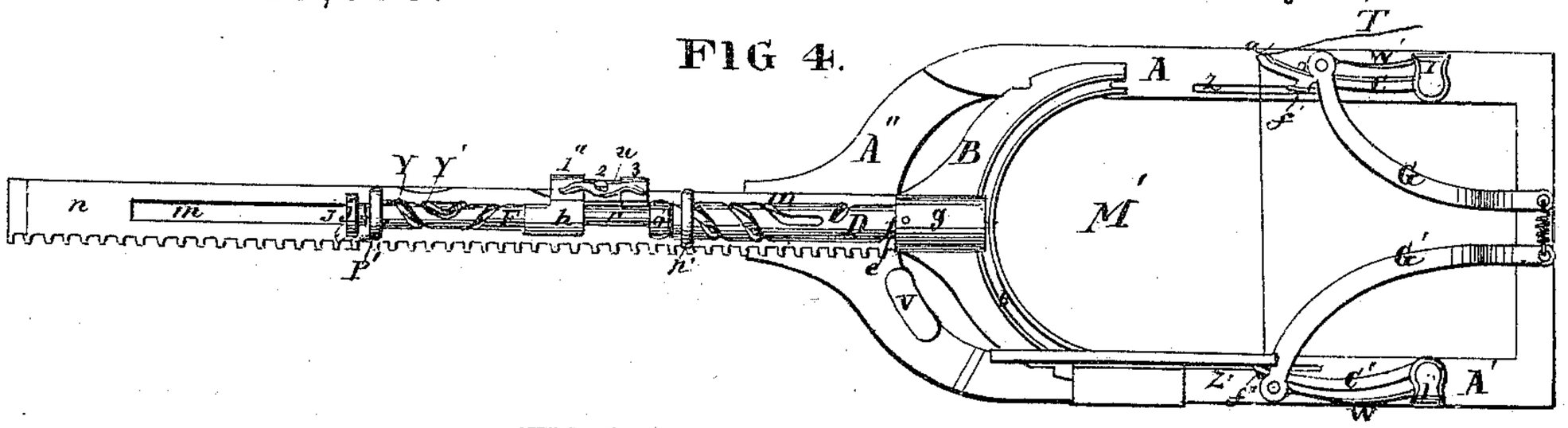

FIG. 5.

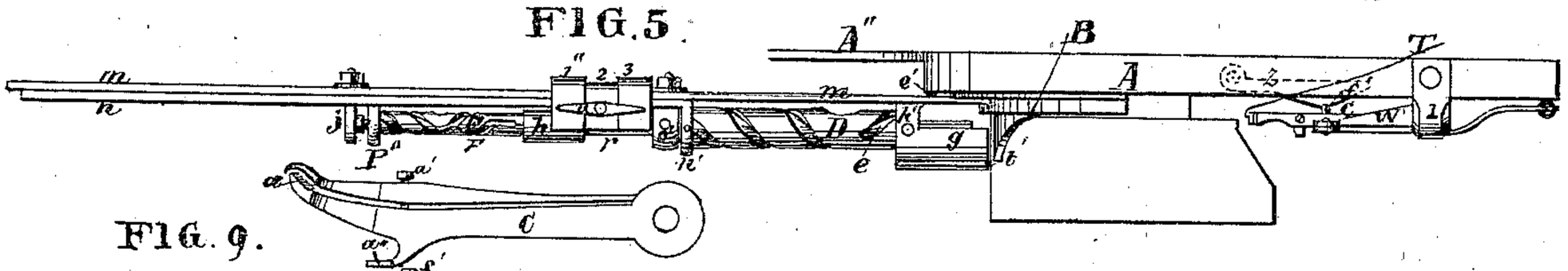

FIG. 9.

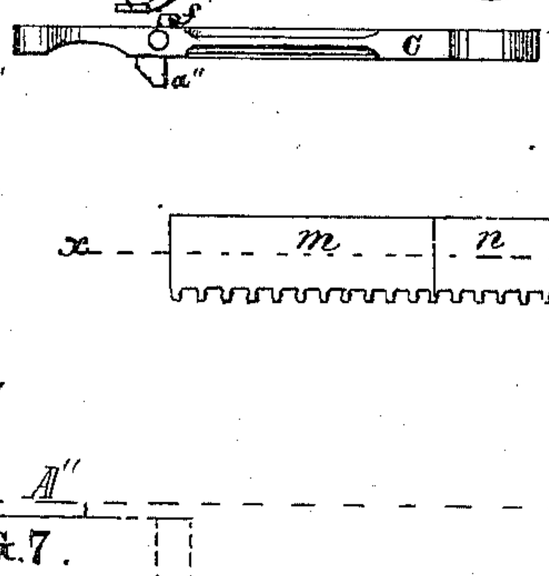

FIG. 6

FIG. 7.

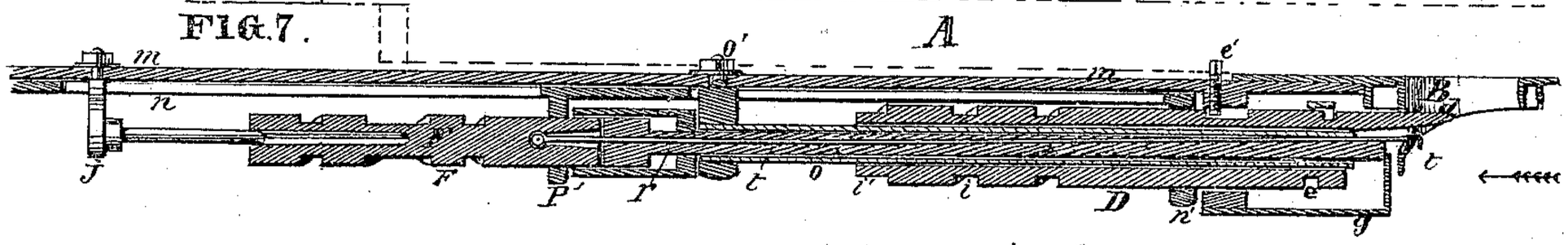

FIG. 8.

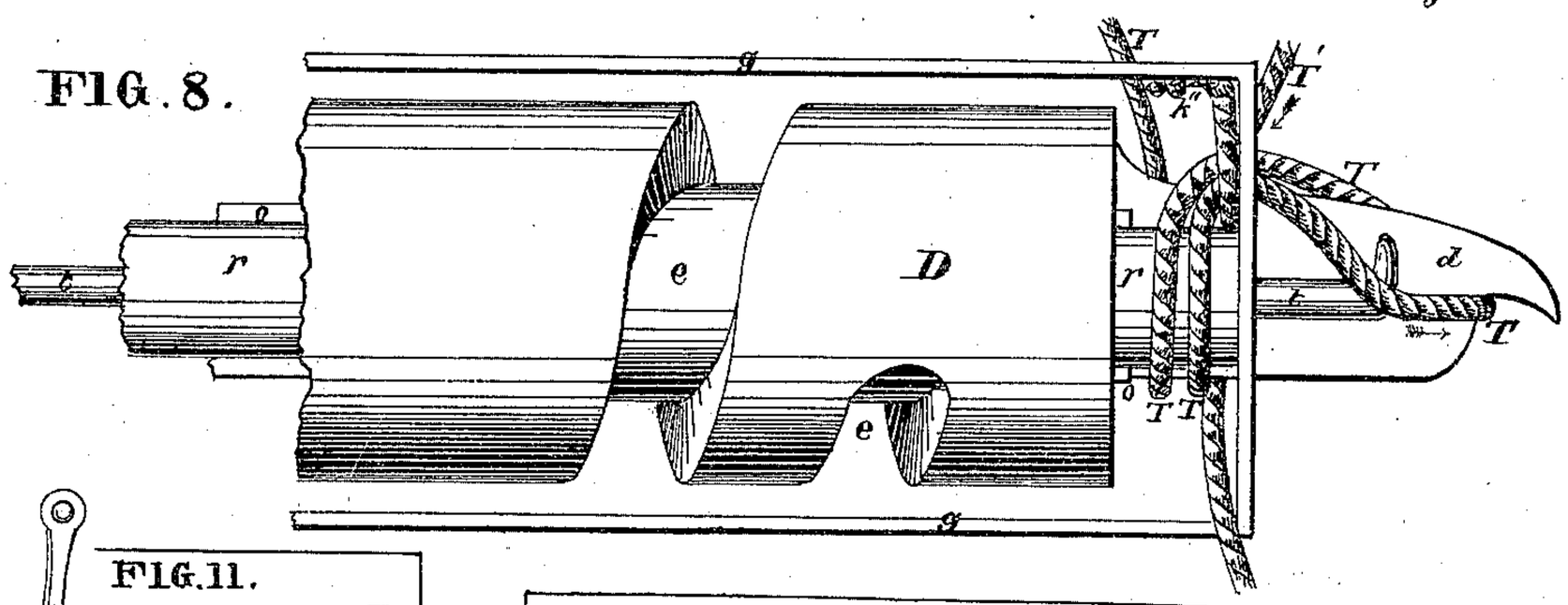

FIG. 11.

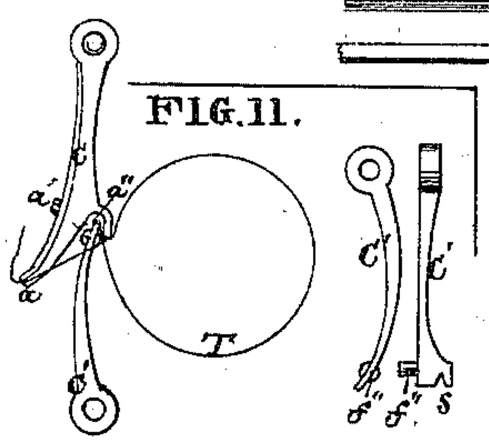

FIG. 10.

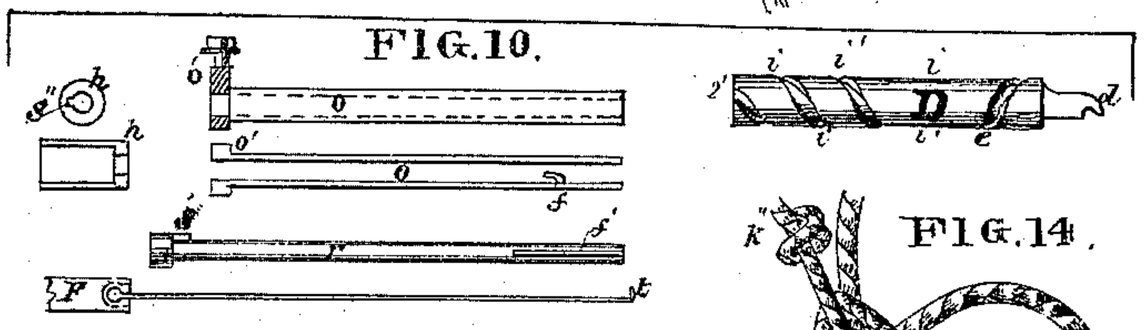

FIG. 14.

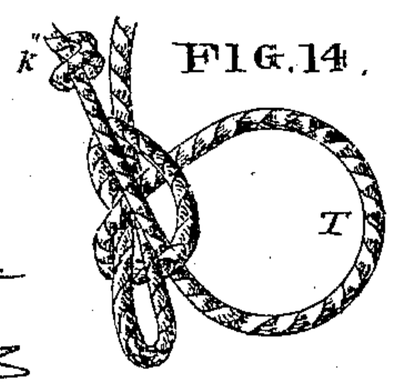

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FIG. 13.

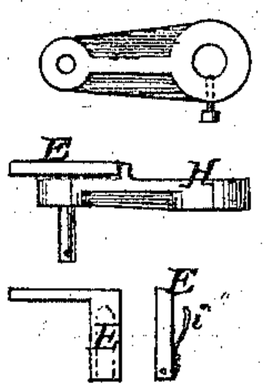
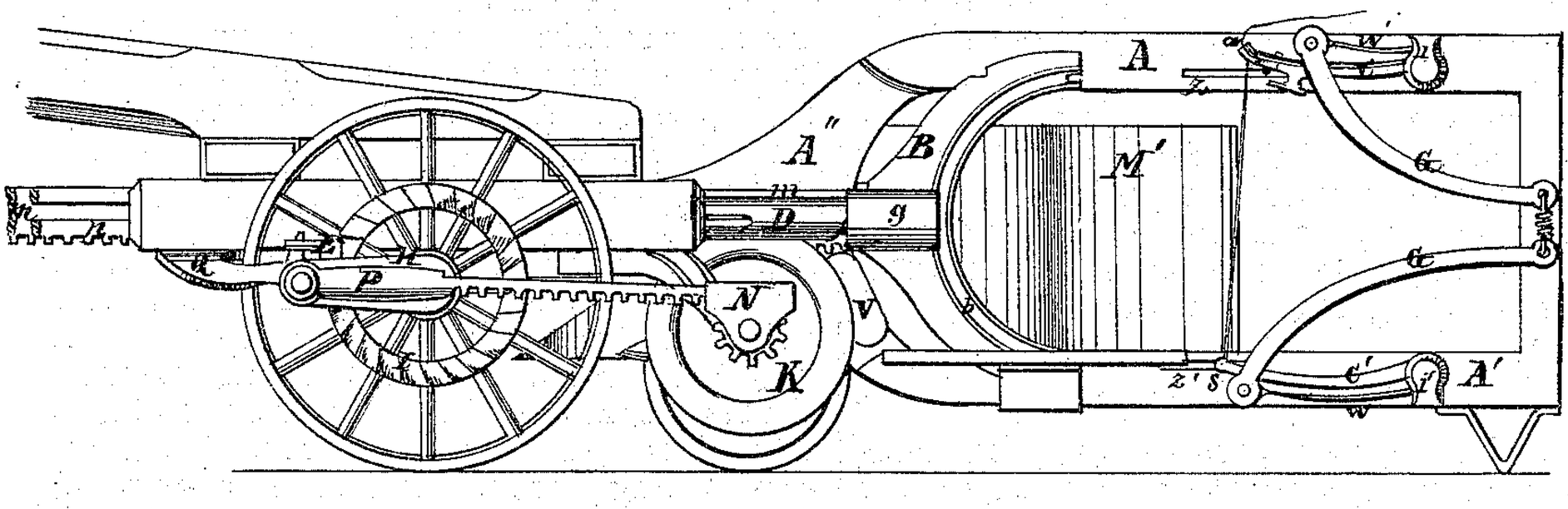


FIG. 2.

FIG. 12.

FIG. 5.



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127,036

UNITED STATES PATENT OFFICE.

NELSON B. FASSETT, OF ST. LOUIS, MISSOURI, ASSIGNOR TO HIMSELF AND ALFRED K. FASSETT, OF SAME PLACE.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. 127,036, dated May 21, 1872; antedated May 11, 1872.

SPECIFICATION.

I, NELSON B. FASSETT, of St. Louis, in the county of St. Louis and State of Missouri, have invented certain Improvements in Grain-Binder Attachments for Reapers, of which the following is a specification:

Nature and Objects of the Invention.

The nature of this invention relates to the novel construction of a grain-binder attachment for reapers; and it consists in devices, hereinafter described, for carrying a band of twine around the bundle and for tying a knot therein.

Description of the Accompanying Drawing.

Figure 1 is a perspective view of my improved binder attachment, showing the mode of attaching it to the reaper and the relative position and locality of both reaper and binder. Fig. 2 is a plan view of the same. Fig. 3 is a side elevation of the same viewed in the direction of the arrow. Fig. 4 is a side elevation of the binder when separated from the reaper. Fig. 5 is a plan view of the same. Fig. 6 represents a side elevation of the same parts while in the act of binding, the gavel being at this time collected and the band around it ready for the knot-tier to tie the two ends of the string together. Fig. 7 is a horizontal plane section of the same cutting the line X Y in Fig. 6. Fig. 8 is a side view of a portion of the knot-tier, drawn to scale of full size, and in the act of tying, as hereinafter more fully described. Fig. 9 is a view of the parts seen in Fig. 7 in the direction of the arrow. Fig. 10 refers to several parts of the knot-tier detached from each other. Fig. 11 represents several views of the arms or band-carrier. Figs. 12 and 13 show a part of the devices for operating the binder, and will be hereinafter fully described. Fig. 14 shows the style of the knot in the band.

General Description.

R and R′ represent, respectively, the horse-power and the apron of the reaper. A, A′, and A″ is the frame of the binder, and is placed permanently behind the horse-power in a vertical plane, the longer way horizontally, so that its space M′ shall command the outlet or delivery of the apron of the reaper. This frame is to be located at a proper distance from the apron, so that the revolving rakes of the reaper, pushing against the butts of the gavel in swinging around, shall deliver the same centrally through the space M′, so that the binding shall be done in the middle of the sheaf.

The construction and operation of this machine may very properly be divided into two general divisions, to wit: first, the several devices for carrying the string-band around the gavel and drawing it tightly into a sheaf; and second, the several devices for tying the two ends of the band together.

Description of the Band-Carrier.

The devices for carrying the band around the sheaf consists of the two arms C and C′, pivoted, respectively, at their rear ends to the elbows 1 and 1′, which are made fast to their respective railings A and A′ of the frame. These arms have on the sides next to the railings a pin, *f′* and *f″*, to fit into a groove, *b*, of the traveling-head B. This head is curved or semicircular in form, having a couple of flanges thrown out from its front surface and forming a curved groove, *b*, to receive the pins *f′* and *f″*, so that as the head is pushed back toward the rear end of the frame (being kept perpendicular by the guides *g′* and *g″*, Fig. 9) the pins *f′* and *f″* enter the curved groove *b* and cause the forward ends of the arms to be brought together and lapped a little by each other, as shown in Fig. 11. The arms are held apart, in the position shown in Fig. 4, by two spring-catches, *z* and *z′*, let into the railings A and A′; a small portion projecting out of the railing and entering a notch made for that purpose in the ends of the pins *f′* and *f″*, Fig. 11. The shape of these two catches and their springs is shown by the dotted lines *z* in Fig. 5, having inclined edges on the outer side, so that as the head is driven over them they are pressed back into the railings and release the arms at the same time the groove catches the pins *f′* and *f″*, Fig. 11, the reverse taking place as the head is drawn back. The lower arm C′, Fig. 11, is provided with a slot, *s*, sunk into the end of a raised portion of the arm opposite the pin *f″*; its object being to hold the lower end of the string, which

is placed in it by the operator, and drawn up until the knot in the end of the string strikes the walls of the slot and prevents it from drawing through. The upper arm C is provided with a tension-jaw, *a*, into which the other end of the string T, Fig. 4, is drawn by the operator after having secured the knotted end to the arm below. This tension-jaw consists of a spring, riveted at the rear end of the upper edge of the arm C, and is provided with a tension set-screw, *a'*, so as to give a greater or less tension to the drawing of the string through the jaw, which is toothed or corrugated for that purpose. As the two arms are brought together, in the position shown in Fig. 11, the string T assumes the position represented, and is clamped between the flange *a''* of the arm and the projecting shoulder *t''*, Fig. 9, of the head, thus preventing that end of the string from slipping by the expansion of the straw while it is being tied around the neck of the knot in the other end, which is held firmly in position by the slot in the lower arm, as previously described. The string being thus drawn around the sheaf, the process of tying the two ends together by the knot-tying device now commences.

Description of the Knot-Tier.

The motive-power for driving the binder is taken from one of the driving-wheels of the reaper, attached to which is a loose crank, H, and pitman P, which, passing through an oscillating stirrup, N, engages a small pinion on the shaft M, which carries the flanged wheel K and imparts a forward and backward movement to the traveling-head B by means of a long rack-bar, *m*, attached to the head at the middle, and working back and forth between the flanges of the wheel K. By one revolution, therefore, of the driving-wheel of the reaper the head B is driven back and forth from one end of the frame to the other over the space M'. Close by the side of the rack-bar *m* the sliding bar *n* slides and operates the knot-tier. This sliding bar is cogged the same as the rack-bar *m*, and also works between the flanges of the wheel K. The two lugs *o'* and *j* pass through their respective slots in the sliding bar *n*, and are there made firm to the rack-bar *m*, so that this bar may slide freely back and forth upon the rack-bar, being always kept close together by the shoulders on these lugs. An elbow, *n'*, is made solid to the rear end of the sliding bar, and through it the large revolving spirally-grooved cylinder D passes. A little further from the end is another lug, P', made firm to the sliding bar, and through it the small spirally-grooved shaft F passes. The cylinder D, Fig. 10, is hollow, having three spiral grooves, *e*, *i*, and *i'*, cut in the outer periphery, two of them, *i* and *i'*, running out at the front end, and the other running around the rear end. The two grooves *i* and *i'* are on opposite sides of the cylinder, one hundred and eighty degrees apart, and pass spirally once and one-fourth around, and then turn lengthwise of the cylinder. The other spiral groove *e* commences on the side next the head, and runs nearly at right angles around the cylinder, making a little toward the front end, and after passing a little over once around, strikes off at an angle of about forty degrees, as shown in Fig. 2. Two small pins enter these two grooves through opposite sides of the lug *n'*, and another small pin, *e'*, enters the groove *e* through the stem *m* and lug *h'*. Inside of this grooved cylinder D is a straight tube, *o*, attached firmly to the lug *o'*, (see Fig. 10,) where it is shown by an external view, and also a sectional view, with the hook *f* for unhooking the string from the hook *t*, as will be hereafter shown. *r* is a grooved spindle, made to fit inside the tube *o*, and having a slot, *f'*, to receive the hook *f*, and also a head with a short feather, *s'*, in the angle to fit into the opening *s''* of the head of the thimble *h*, so that as the spindle is placed through the hole in the thimble *h* the feather *s'* may draw into the opening *s''*, when the thimble is then slipped over the end of the spirally-grooved shaft F. The long wire hook *t* is made fast to the shaft F by a pin, and runs diagonally through the whole length of the spindle *r*, coming out at the rear end just at the surface of the spindle, and touching the tube *o*, Fig. 7. This wire hook is made to work freely back and forth through the diagonal opening of the spindle, and has its hook at the rear end, Fig. 8. As the head of the spindle is drawn out so that the feather *s'* enters the opening *s''*, the shaft F cannot turn without turning the spindle; but when the head of the spindle is shoved far enough into the thimble, the feather is drawn out of the opening *s''*, when the shaft F may turn freely without turning the spindle.

The shaft F has two spiral grooves, Y and Y', Fig. 4, on opposite sides, each groove commencing at the front end, and running three-fourths of the distance around, and then reversing, runs back three-fourths to the line of beginning, terminating at the rear end, near the thimble *h*. The lug P' has two pins through the rim to enter the spiral groove, so that as the sliding bar *n* is shoved along these pins will cause a rotary movement of the shaft F three-fourths around, back and forth, the hook *t* performing a corresponding movement. The stops 1'', 2, and 3, and the spring *u*, are made to prevent the shaft from being influenced by its grooves and turning before the proper time for it to turn. The middle stop 2 is stationary upon the upper edge of the rack-bar, and holds the spring *u*, and by means of slight depressions cut in the upper edge of the sliding bar *n*, the other two stops, 1'' and 3, are made to rise and fall so as to prevent the shaft from turning, except at the proper times, as will be hereafter shown.

As before stated, the carrying of the string around the sheaf is done by the simple process of shoving the head B back to the rear end of the frame, as shown in Fig. 1, and the tying of the ends of the string together is done by

shoving the sliding bar *n* back still further to the nose-piece *g* and then drawing it forward. While this operation of tying the knot is being done, it is evident that the head B must remain unchanged in the position shown in Fig. 1, until the sliding bar has gone back and forth. This is effected by a latch, *r'*, which is seen by different views in Fig. 12. This latch is pivoted upon a pin, which is made fast to the back side of the rack-bar *m;* and on the side of the latch next to the rack-bar is a slot running from about midway of the latch to the front end to receive the pin *k'* on the wheel K. On the outside of the latch is a spring, *v*, with two lips, *t'* and *t''*. The lip *t'* is designed to slide up an inclined plane, *v'*, on the wheel, as the rack-bar *m* is carried along in the direction of the arrow. The lip *t''* is only to fill an opening into the rear end of the slot, from the under edge of the latch. By this inclined plane *v'*, the spring *v* is lifted from the latch *r'* so as to let the pin *k'* pass through, under the lip *t'*, into the slot in the latch *r'*.

As the wheel continues to turn and the rack-bar *m* is thereby carried along, the spring finally settles back to its place and holds the pin *k'* in the slot, and as the wheel continues, the pin carries the rear end of the latch down until it passes the center of the wheel, when the omission of the cogs of the rack-bar *m* prevents the stem and head from further travel just at the time when they have reached the position shown in Fig. 1. As the wheel still continues, the latch *r'* is carried down further and further, the pin still running in the slot. During this time the cogs on the sliding bar *n* are carrying it up and completes its travel to the nose-piece *g* just at the time the crank H is exhausted on its rear center; and on its return the head B is held back by the pin *s*, Fig. 12, striking the edge of the dog V on the part A'' of the frame, until, when the sliding bar is drawn clear forward, and the pin *s* rides over the upper end of the dog V, both rack-bar and sliding bar are drawn back together. When the loose crank H has reached its forward center, the inclined plane on the trip *a*, Fig. 1, throws the catch E of the crank out of the teeth of the revolving ratchet I on the driving-wheel, and stops the binder, and now remains stationary until the rake that rakes the grain into the binder shall, by any automatic device, pull the wire *s'''*, Fig. 1, which throws the outer end of the trip Q forward and lets the spring *i''* throw the catch E into the revolving ratchet I, and again sets the binder at work. The crank H is kept on the shaft by a pin, which enters a groove near the end of the shaft and turns freely, except when in gear with the ratchet of the wheel.

The working of this machine is as follows: The operator who is to attend it walks by its side to place the strings and remove the sheaves. The former is done by taking one of the strings, previously prepared by being cut the right length and having a knot tied at one end, and drawing it into the slot *s* in the front end of the lower arm, the knot preventing it from drawing through. Having done this, he then carries the other end up and draws the string tightly into the jaw *a* of the upper arm. The binder being now strung ready for the grain, the gavel is delivered into the space M', forward of the string T, by the revolving automatic rake commonly used on reapers, but not here represented. This done, the binder is automatically thrown into gear by any device (not represented) connecting the rake with the wire *s'''* attached to the trip Q, which needs only a sudden jerk or pull to set the binder at work, as before described. At once the head B commences traveling backward, forcing the straw against the string T until, having pressed the springs *z* and *z'* back and released the arms, the groove *b* catches the pins *f'* and *f''* and forces the two ends of the arms together, causing the string to be drawn tightly around the sheaf in the proper position for the knot-tier to tie the two ends together. The two compressers G and G' have a coil spring at their rear ends, and a flat spring *w'* and *w*, respectively, at their front ends, to aid the string in drawing the straw together. When the arms are thus brought together the head B stops traveling, and the traveling rack-bar is at once shifted from the stem *m* to the sliding bar *n*, and the process of tying the knot now commences. The stop 1'' being at this time down against the projection on the outside of the thimble *h*, prevents the shaft F from turning, and as the sliding bar is carried along the shaft F is carried along without rotatory motion, and the spindle *r* is shoved into the tube *o* until its rear end strikes the nose-piece *g*, as seen in Figs. 7 and 8. At this time, the stop 3 being lifted, the shaft F commences to turn. During this time the cylinder D has turned partly round, its hook *d* seizing the string T from the jaw *a*, and, winding it around the end of the spindle, carries it out through the opening in the head, keeping the other end of the string between the spindle and hook *d*. The shaft F, revolving back and forth, carries the wire hook *t* around, so as on its return to catch the string from the hook *d*, as shown in Fig. 8 in full size. The spiral groove *e* in the rear end of the cylinder D directs the hook *d* around and out in the proper manner. The crank H at this time is on its rear center, and as it continues around, and the stop 3 being now down, prevents the shaft from turning, and hence the wire hook *t* is drawn straight back and carries with it the string T and spindle *r*. The noose of the string now slips off over the end of the spindle and is drawn up tight into a knot around the other end of the string; the hook *t* having hold of the loop makes a bow-knot. The stop 1'' is now lifted, and the shaft turns three-fourths around, and carries the spindle with it, and the hook *f* in the tube *o* (Fig. 10) unhooks the bow of the knot from the hook *t* and releases it. The shaft F now resumes its original position, the cylinder turns back, and the whole knot-tier resumes its original posi-

tion, and all are brought back together. As the sheaf is bound the operator removes it and again strings the binder, when all is in readiness for the next gavel. As the bands are all to be previously prepared they may, if desirable, be taken off when thrashing the grain, and be put on the following year, and so on from year to year. As the string T is drawn around the sheaf, it is clamped between the shoulder t'' of the head and the projection a'' of the upper arm. This is to prevent the expansion of the sheaf drawing the string out as soon as the hook d lifts it out of the jaw a.

The kind of knot which is tied by this binder is represented by Fig. 14, it being a looped slipping noose of the string at one end around the string near the knot k'' at the other end, there being two knots to constitute this tie—the one made by hand and the other by the machine. It is evident that, as the straw is forced back against the string T, the two front ends of the arms C and C′ will tend to approach each other, so that as soon as they are released from their respective catches Z and Z′ they will come together by the action of the string alone, and without the aid of the head B or groove b, and draw the string around the sheaf in the same manner as though the pins f' and f'' had entered the groove, the grooves being employed only to insure exactness of movement.

Claims.

What I claim as my invention is—

1. The two pivoted arms C and C′, arranged to be drawn together by the action of the string when the bundle is pressed between them, in combination with the curved groove b, as described.

2. The cylinder D having three grooves, e, i, and i', and hook d, as set forth and described.

3. The grooved shaft F, in combination with the wire hook t and stops 1, 2, and 3, in the manner set forth and described.

4. The stops 1″, 2, and 3, in conbination with the shaft F and sliding bar n, in the manner set forth and described.

5. The hook t, in combination with the hook f in the tube O, in the manner set forth and described.

6. The spring-catches z and z', in combination with their respective arms C and C′, in the manner set forth and described.

7. Sliding bar n, in combination with the grooved cylinder D and spiral shaft F, in the manner set forth and described.

8. The compressors G and G′, in combination with the pivoted arms C and C′, as set forth and described.

9. The pivoted slotted latch r', in combination with the spring v, wheel K, dog V, and rack-bar m, for the purpose set forth and described.

10. The sliding bar n, in combination with the long rack-bar m for operating the cylinder D, as set forth and described.

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Attest:

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