(Model.)

3 Sheets—Sheet 1.

J. E. BUXTON.

KNOTTER FOR GRAIN BINDERS.

No. 307,176. Patented Oct. 28, 1884.

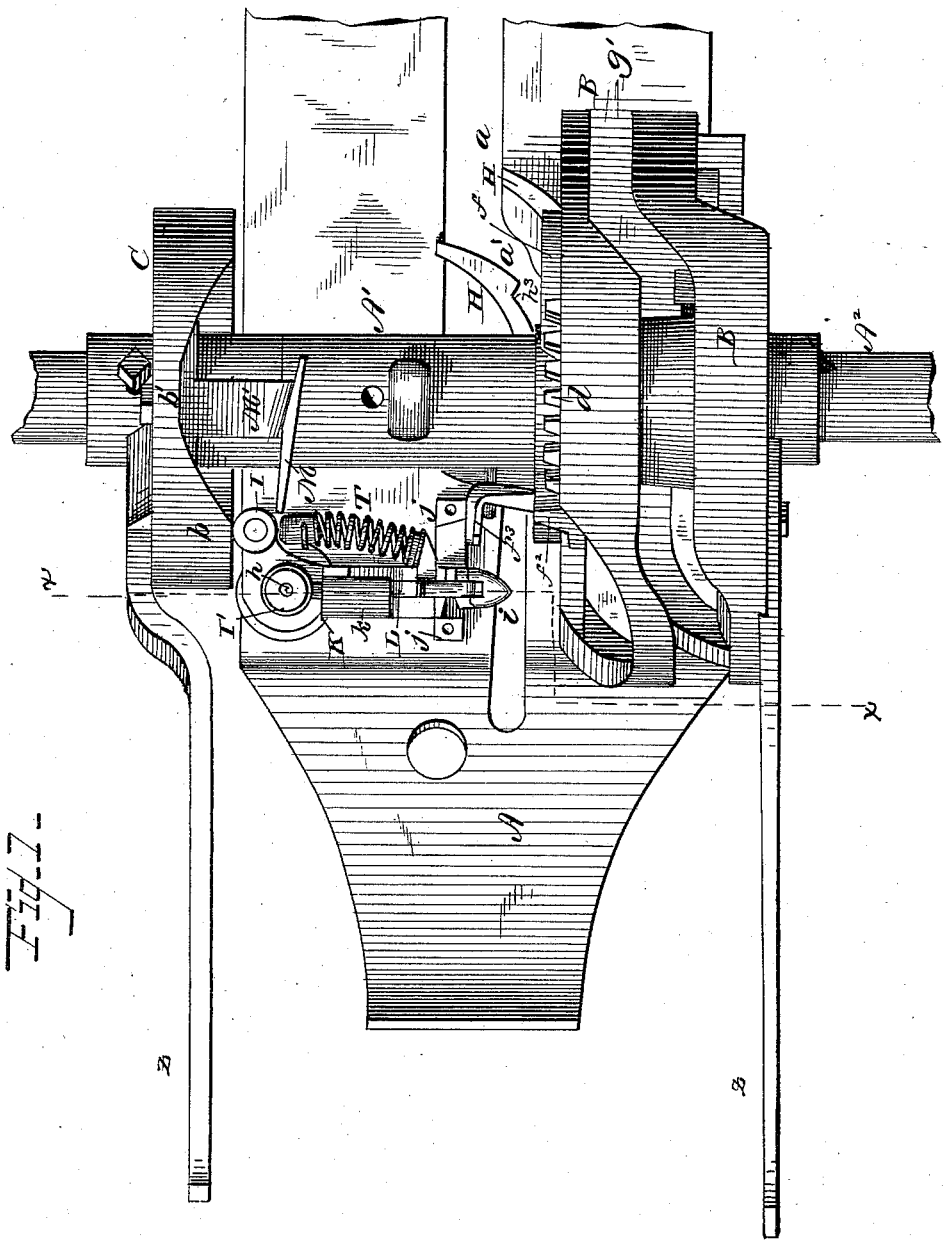

Fig. 1.

WITNESSES

Franck L. Durand

Wm A Garner

INVENTOR

John E. Buxton

by L. Deane.

his Attorney.

N. PETERS. Photo-Lithographer, Washington, D. C.

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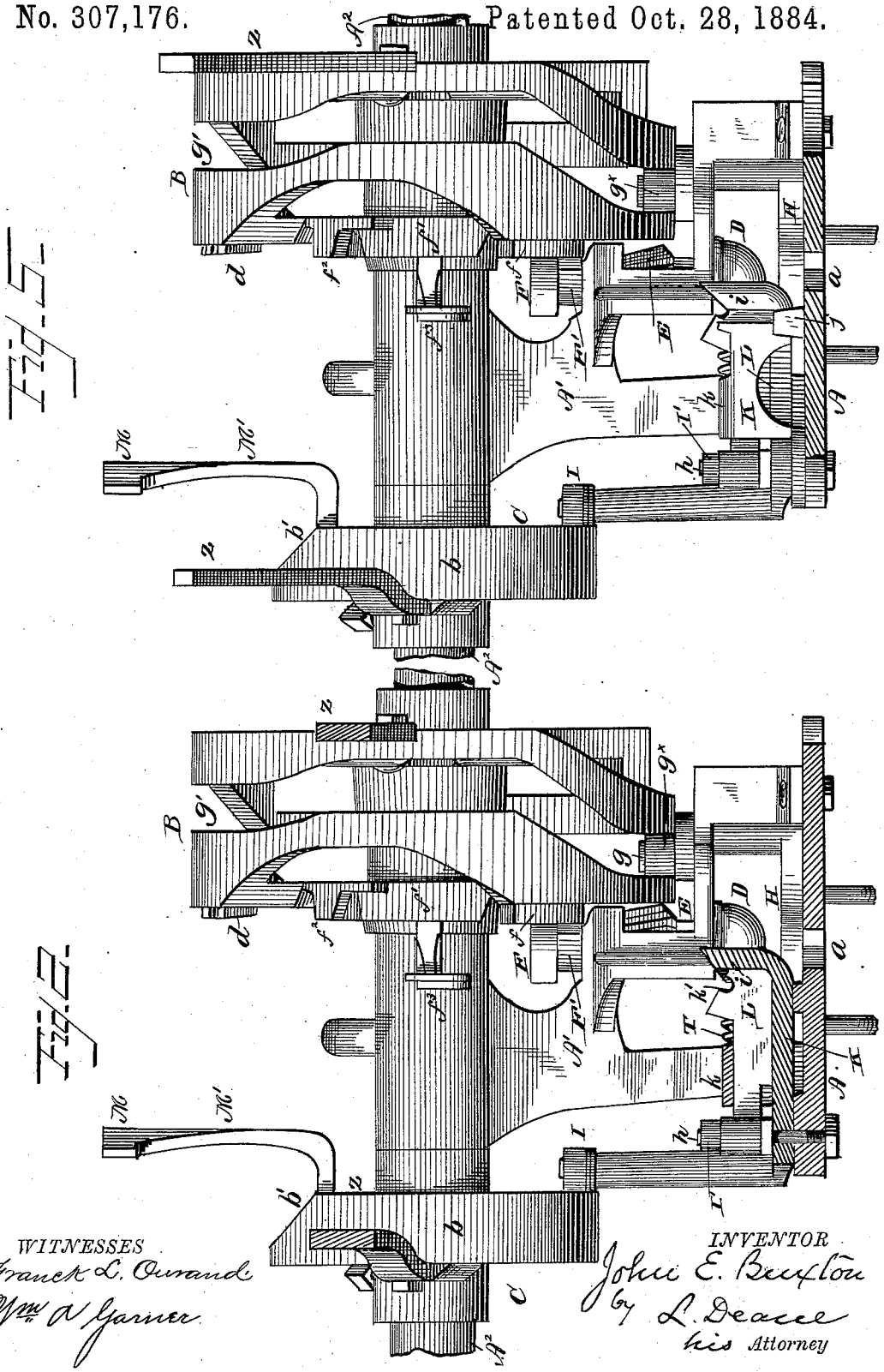

Fig. 1.

Fig. 2.

WITNESSES
Franck L. Durand
Wm A Garner

INVENTOR
John E. Buxton
by L. Deane
his Attorney

N. PETERS. Photo Lithographer, Washington, D. C.

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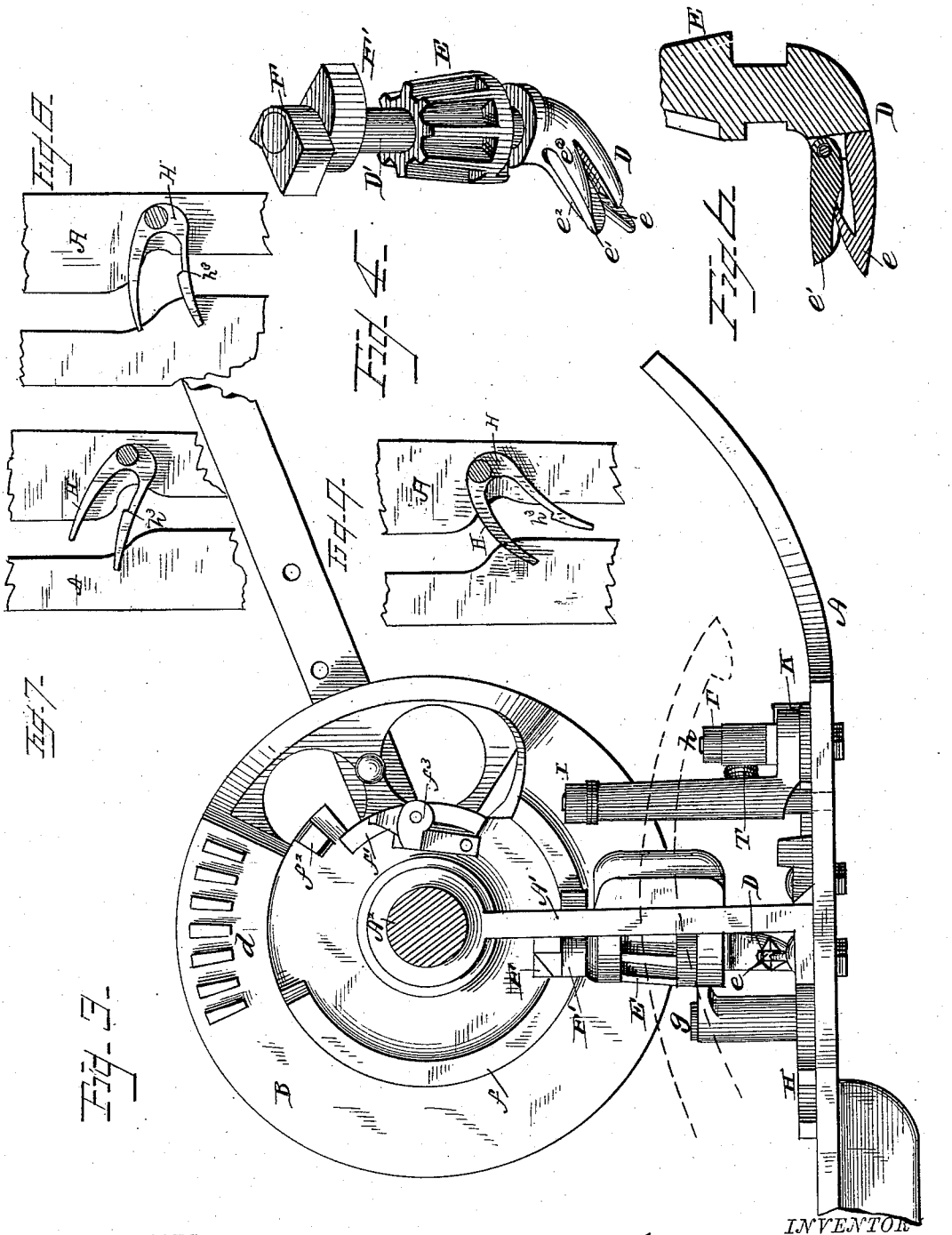

WITNESSES
Franck L. Ouseley
Wm A Garner

INVENTOR
John E. Buxton
by L. Deane
Attorney

N. PETERS. Photo-Lithographer. Washington. D. C.

UNITED STATES PATENT OFFICE.

JOHN E. BUXTON, OF OWATONNA, MINNESOTA.

KNOTTER FOR GRAIN-BINDERS.

SPECIFICATION forming part of Letters Patent No. 307,176, dated October 28, 1884.

Application filed June 16, 1883. (Model.)

To all whom it may concern:

Be it known that I, JOHN E. BUXTON, a citizen of the United States, residing at Owatonna, in the county of Steele and State of Minnesota, have invented certain new and useful Improvements in Grain-Binding Apparatus; 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 appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a top plan view of the knotting devices, part of the slotted breast-plate being broken away. Fig. 2 is an outer side view, partly in section, the section being taken in the vertical plane indicated by the dotted lines *x x* on Fig. 1. Fig. 3 is an end elevation with the cam-flanged wheel removed. In this figure part of the needle which delivers the cord to said devices is shown dotted. Fig. 4 is a view of the knotter, and its shaft and tappets detached from the machine. Fig. 5 is an outer side view of the device, the upturned portion of the breast-plate being broken away. Fig. 6 is a sectional view of the knotter. Figs. 7, 8, and 9 are details showing the three movements of the cord-guide.

This invention relates to improvements on cord tying and knotting devices, which are used in connection with other devices, the whole constituting a mechanism for binding grain on a harvesting-machine, which improvement will be fully understood from the following description and claims when taken in connection with the annexed drawings.

A designates the breast-plate of the machine, the outer end of which is turned up, as usual. This breast-plate is slotted, as shown in Fig. 1, for the passage of the needle. Upon this breast-plate A is rigidly secured a standard, A′, the form of which is represented in Fig. 2, and journaled in the top of this standard is a shaft, A^2, on one end of which is keyed a wheel, C, having a flange, *b*, which is notched at *b′*, and on the other end of this shaft is keyed a compound cam and gear wheel, B.

D designates the knotter, which projects at right angles from its vertical shaft D′, that has its bearings in portions of the standard A′, and which has keyed on it a beveled spur-pinion, E, adapted to engage at times with a number of teeth, *d*, on the face of the cam and gear wheel B, which revolves the knotter. This knotter consists of a fixed lower barbed cutting-jaw, *e*, and an upper grooved jaw, *e′*, which is pivoted within and plays in a slot in the upper fixed jaw, so that its grooved and beveled edges will drop on the point of the said barb.

On the upper end of the knotter-shaft D is keyed a tappet, F, which is acted on by a concentric cam-rib on the face of the cam-wheel B, and also by a striker, f^3, which is on the end of a bent arm that is fixed to the wheel B alongside of the cam-rib *f′* There is also a delay-shoe, F′, on the knotter-shaft D′, below the tappet F, the flat surface of which bears against the rib *f* on cam-wheel B, and positively holds the knotter D in proper position to receive the cord, after which the shoe F′ is released from rib *f*, and acted on by lug f^2.

Below the knotter D is the bifurcated cord tucker or placer H, which vibrates across the curved and enlarged portion of the slot through the bed-plate A. This cord-placer vibrates upon a stud or pin, *g*, which is fixed to the breast-plate, and its angular arm has an anti-friction roller, $g^\times$, on it, which works in the cam-slot *g′* in the periphery of the wheel B, the general form of which is represented in Figs. 1 and 2.

I will now describe the device for grasping and holding the cord at proper times during the formation of the knots.

K designates a horizontally-vibrating bell crank lever or frame, which has its fulcrum on a stud, *h*, fixed to the breast-plate A. From one arm of the lever K rises perpendicularly a post, on which is an anti-friction roller, I, arranged to bear against the edge of the flange *b* of wheel C and prevent vibration of the cord-holder during the greater part of the revolution of said wheel. The free end of the longest arm of the holder-lever K has a vertical grooved and beveled end, *i*, formed on it, and this grooved and beveled end constitutes the rigid jaw of the holder and vibrates be-

tween two stop-lugs, *j j*, on the breast-plate A, it being held against the rear one of the lugs by a spiral spring, T.

L designates the grasper-bar, which carries the movable jaw of the cord-holder, and is endwise movable in a guide or sheath, *k*, formed on the lever K. The end of the bar L is notched and beveled at *k'*, and this end is held in contact with the grooved and beveled end comprising the rigid jaw *i* by the spring T, as shown in Fig. 1. The outer end of the bar L has an anti-friction roller, I', applied on it arranged in the path of a cam, M, which is on the end of a long radial arm or sweep, M', secured rigidly to the inner side of the flanged wheel C at the point where the notch *b'* is made in the flange *b*. At the proper time during each revolution of the wheel C the cam M will strike the anti-friction wheel I' and retract the grasper-bar L and release the cord, which, when it is released, will be returned to its place by the spring T.

Having thus described the construction and arrangement of my knotting devices, I will now describe the operation of the same. The end of the binding-cord, after being passed through the eye of the needle, is placed in the cord-holder. The needle shown in dotted lines in Fig. 3 recedes and lays the cord over the knotter-hook and in between the fingers of the cord placer. The needle then remains down until a sufficient quantity of grain accumulates in the receptacle of the binder to start the binding mechanism, when the needle moves forward and brings the cord around the bundle and between the fingers of the cord-placer, and, by means of the crooked slots *g'* in the cam-wheel B and the roller $g^{\times}$ on the arm of the cord-placer, this placer is then vibrated, so that it stands with its fingers about at right angles across the slot through the breast-plate A, whereby both strands of the binding-cord are held down within reach of the knotter-hook. The knotter-hook is now caused to make a revolution, looping the cord around the two rigid jaws, and toward the latter part of the revolution the open mouth of the knotting-hook takes in the two cords, extending the one to the holder, the other to the eye of the needle, and permits them to pass over and back of the cutting-barb of the knotter-hook, which is now in the same position it was before its revolution. When wheel B moves far enough to release the knotter-pinion from the segment *d*, the tappet F on the shaft of the knotter-hook is struck by a lug, f^2, on wheel B and turns the knotter one-half a revolution backward, so that the knotter-jaws point outward from the machine, and when the discharge-arms Z Z throw the bundle from the machine the knot is pulled off the hook and tightened. The pivoted compressing or holding jaw in the knotting-hook is without an inwardly-extending heel, and when the knotting-hook is turned so that its jaws turn outward in the direction of the discharge for the purpose of letting the discharge-arms strip the knot therefrom the cord placer or guide is also turned outward, so that the cords may slip out of said placer or guide, and as the wheel B revolves the knotter and the cord-placer are thrown back into their original position, ready for repeating the operation on another bundle. While the gavel is being packed into the grain-receptacle the cord-guide stands up in the position shown in Fig. 7, and the end of the cord is held in the cord-holder, when the binding mechanism is tripped into gear and the eye of the needle is brought over far enough to bring the upper part of the cord within the fork of the cord-guide, the guide drops, as shown in Fig. 8, and brings the two strands of cord down over the knotter-hook. The lower part of the guide is designed to hold the cord in proper position. When the cord-guide drops down, as shown in Fig. 9, it slackens the under cord and relieves the strain, so that the cord will be in no danger of breaking. The projection h^3 is intended to hold the cord back, so as to form the loop near the back part of the knotter-hook, and thus give sufficient room for the two cords to enter the jaws of the knotter-hook. While the needle is at rest and the packers are packing the grain, the flange-wheel C holds the grasper until the binder is started. This wheel continues to turn until the notch *b'* in its flange is opposite the roller I of the grasper-lever, at which moment the knotter-hook commences to revolve, and by the winding of the cord around the hook it pulls the cord-holder up toward it, and at that instant the beveled piece or cam M strikes the roller I' and opens the jaws of the holder and releases the end of the cord and takes the other part of the cord again near the end of the needle by the action of spring T closing the jaws.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the slotted breast-plate A and its standard-bearings, of a cam-wheel, B, having a cam-slot, *g'*, segmental face-ribs, and a segment of teeth, and a vibrating bifurcated cord-placer, H, all constructed and adapted to operate substantially as described.

2. The combination of the forked cord-placer H, vibrated by means of a slot in cam-wheel B for delivering the cord to the knotter, and the breast-plate A, having a curved slot, *a'*, through it, substantially as described.

3. The revolving knotter having a lower rigid jaw provided with cutting-barb *e*, an upper rigid jaw, e^2, and a grooved-edge tongue, *e'*, pivoted therein, in combination with a pinion, E, tappet F, a delay-shoe, F', and a cam-wheel having concentric ribs, a lug, and a toothed segment on its face, substantially as described.

4. The combination of the yielding cord-holder frame K, having a grooved rigid jaw on one end, stops on the breast-plate, a spring-actuated bar carrying the movable jaw and

the anti-friction roller, the cam-flanged wheel C, having a notch in its flange, and the cam M opposite thereto, adapted to retract said bar, all constructed and adapted to operate substantially as described.

5. The combination of the yielding spring-actuated cord grasper and holder, the cam-flanged wheel C, notched as described, and its cam M, the revolving knotter having a barbed cutter, the vibrating forked cord-placer, and the gear and cam wheel B for operating the knotter and placer, substantially as described.

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

JOHN E. BUXTON.

Witnesses:
J. W. ANDREWS,
H. D. HALE.