

J. R. PRESCOTT.  
GRAIN-BINDER.

No. 176,550.

Patented April 25, 1876.

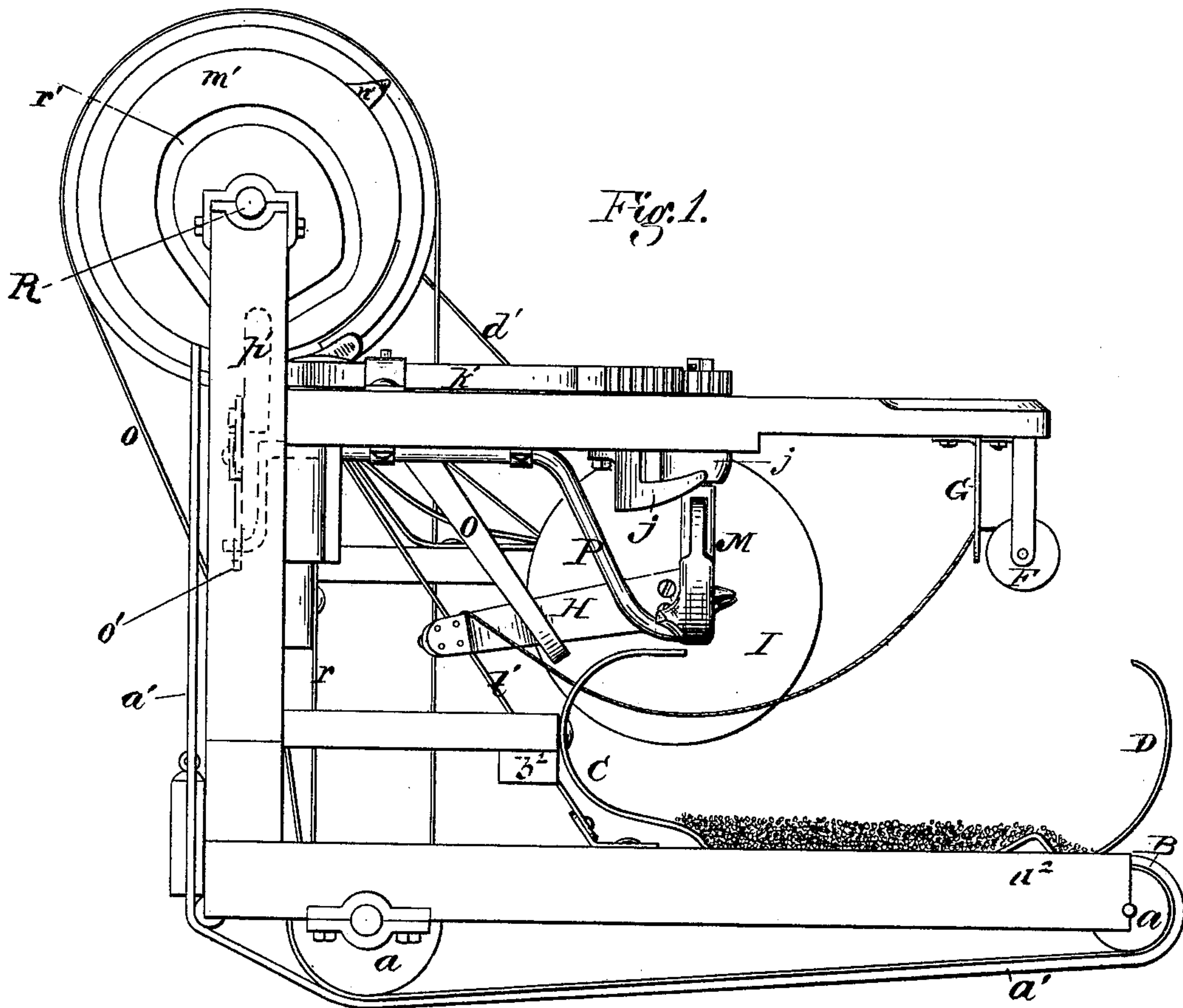
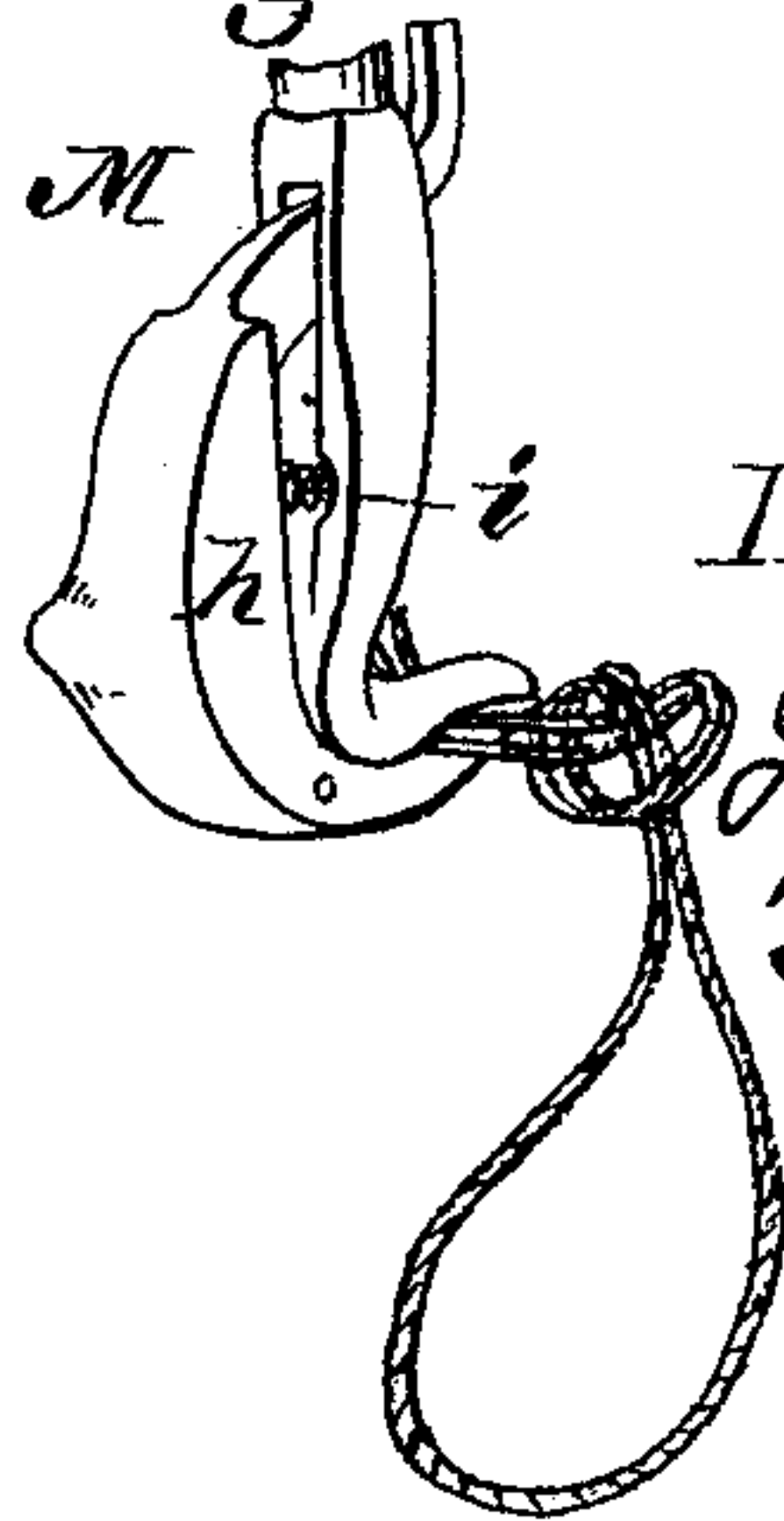
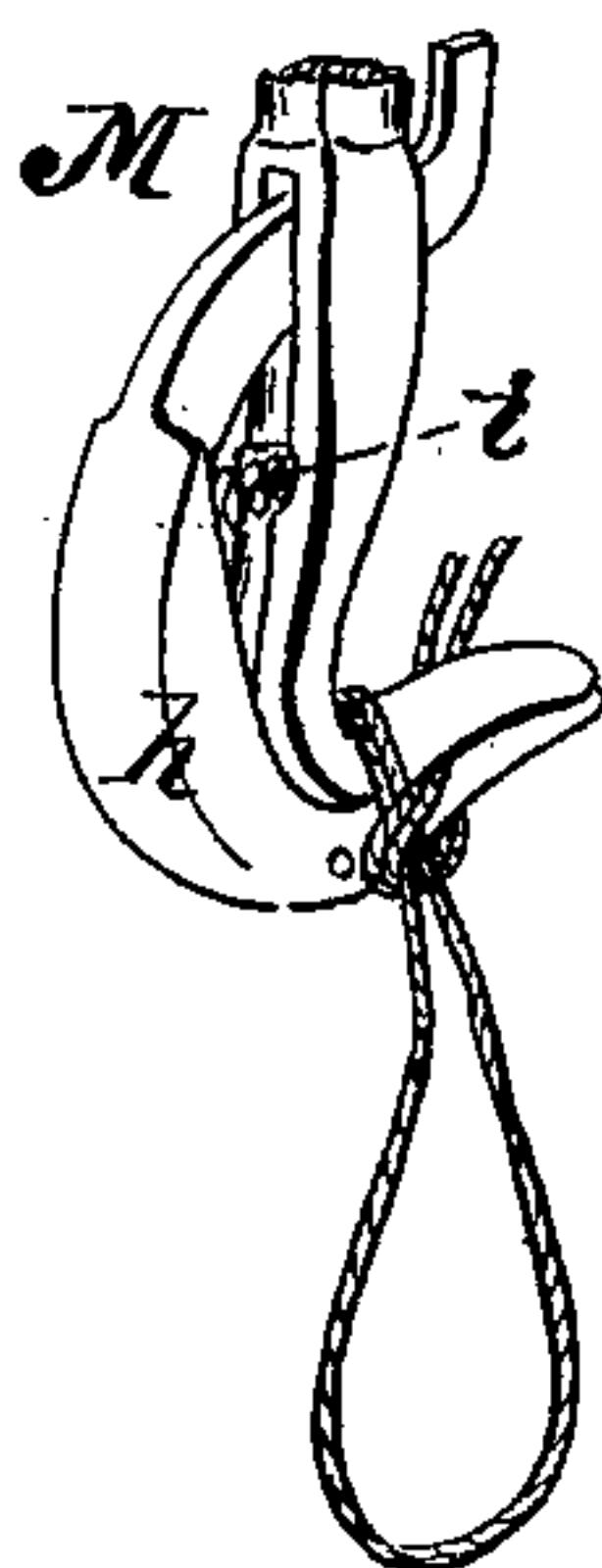
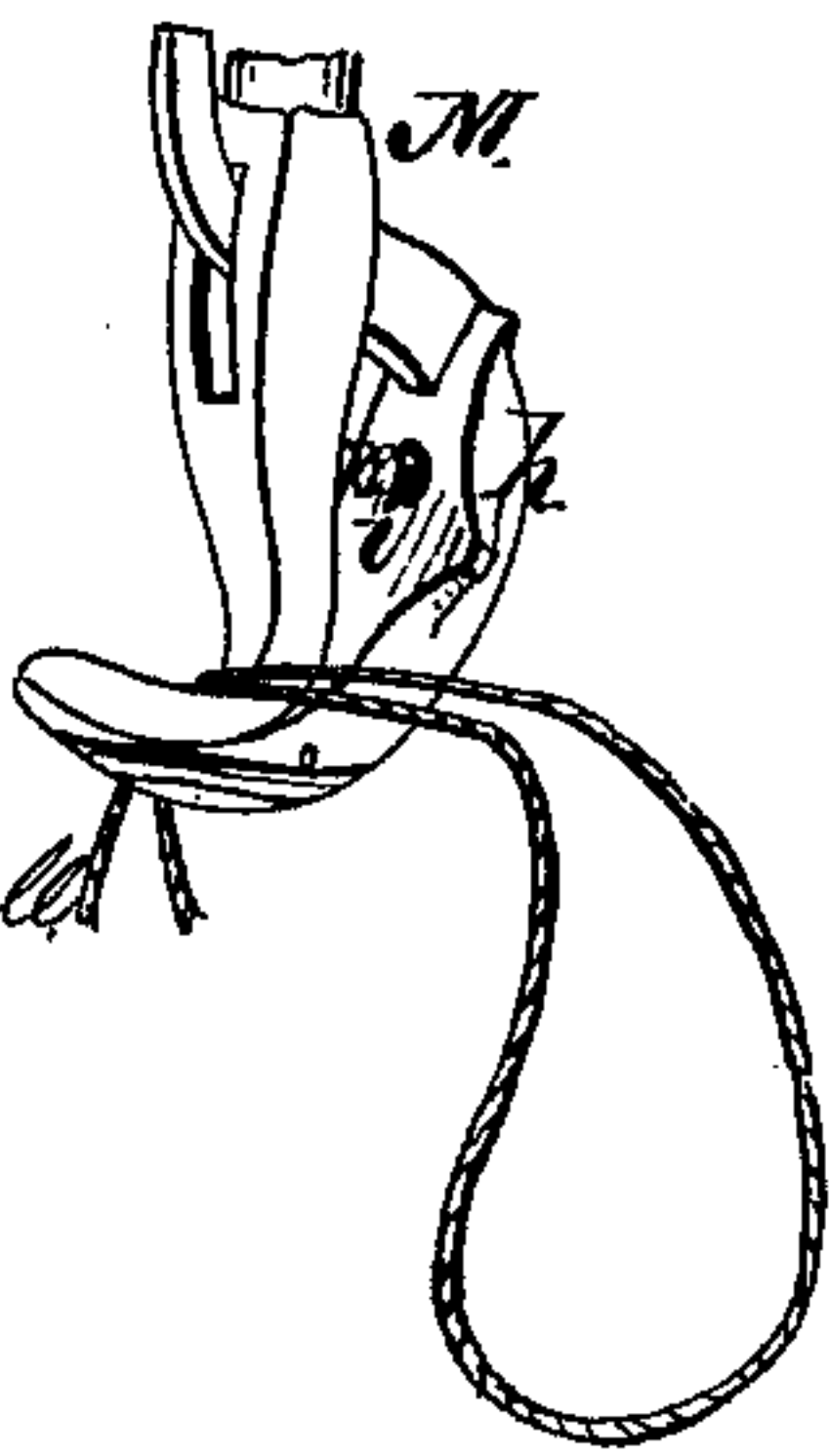


Fig. 7.

Fig. 8.

Fig. 9.



Witnesses.

Will H. Dodge.  
Denn Twitchell.

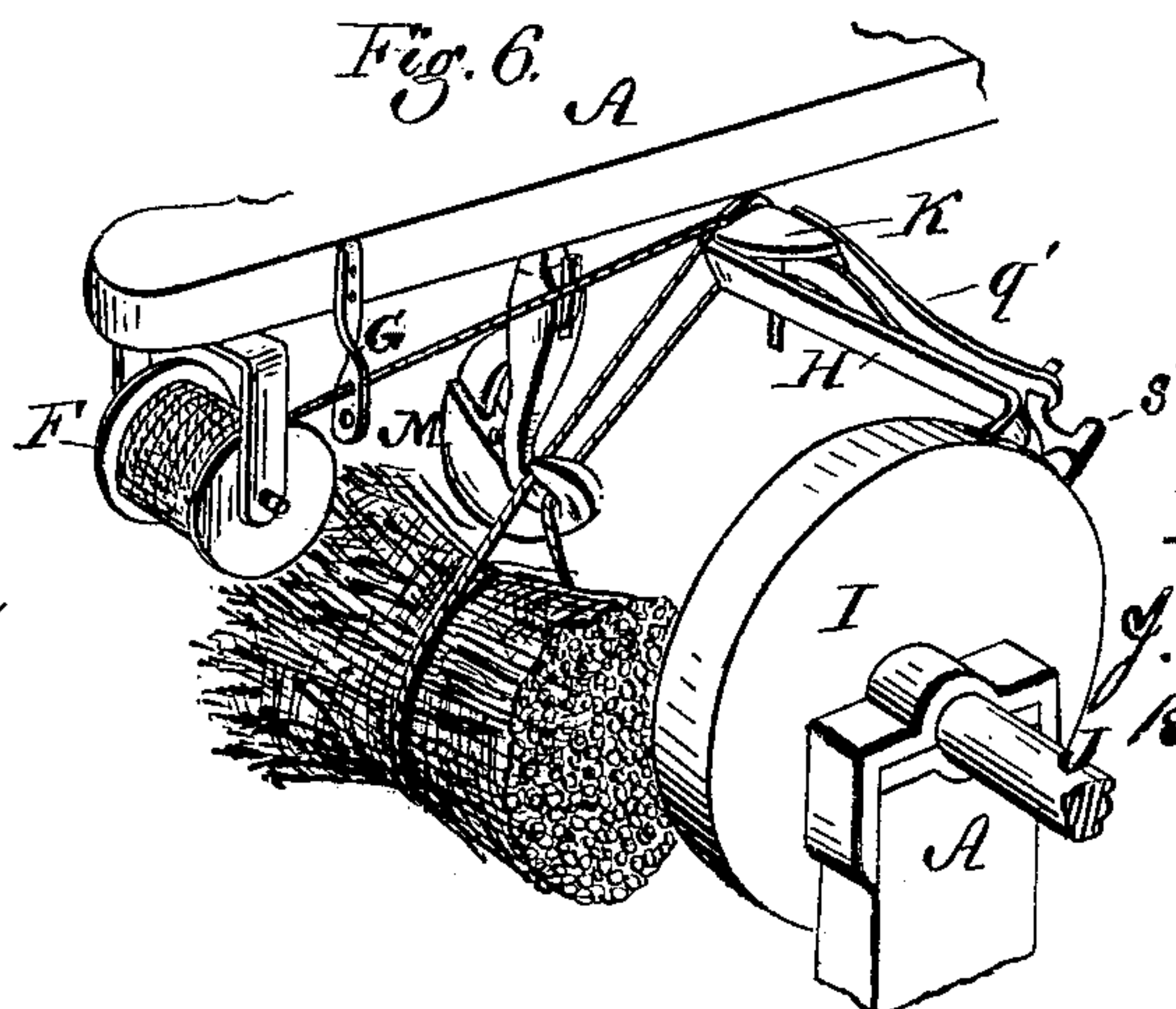
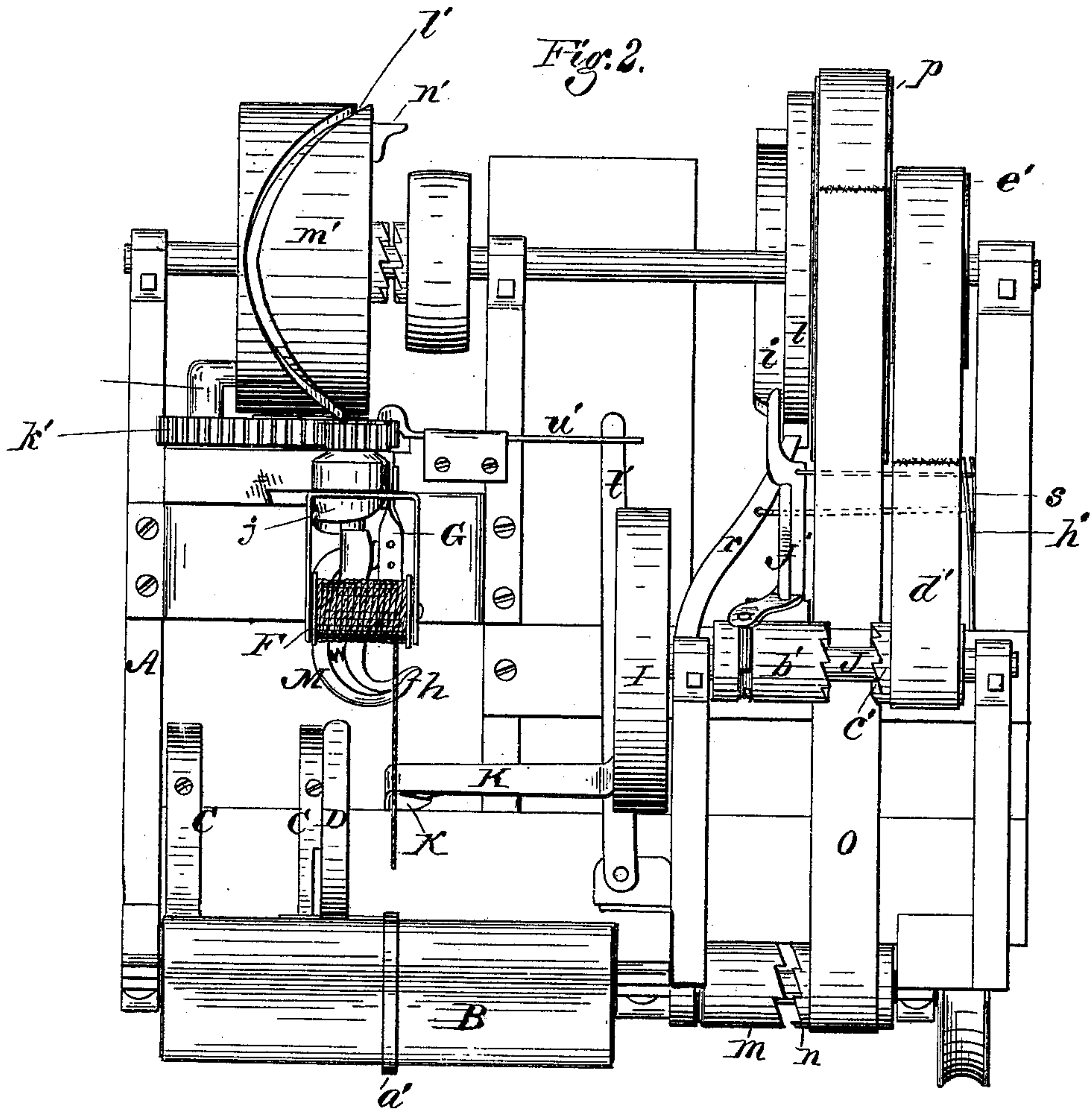
Inventor:

J. R. Prescott.  
By his attys  
Dodge & Son.

J. R. PRESCOTT.  
GRAIN-BINDER.

No. 176,550.

Patented April 25, 1876.



Witnesses:

Will H. Dodge  
Donna Twitchell.

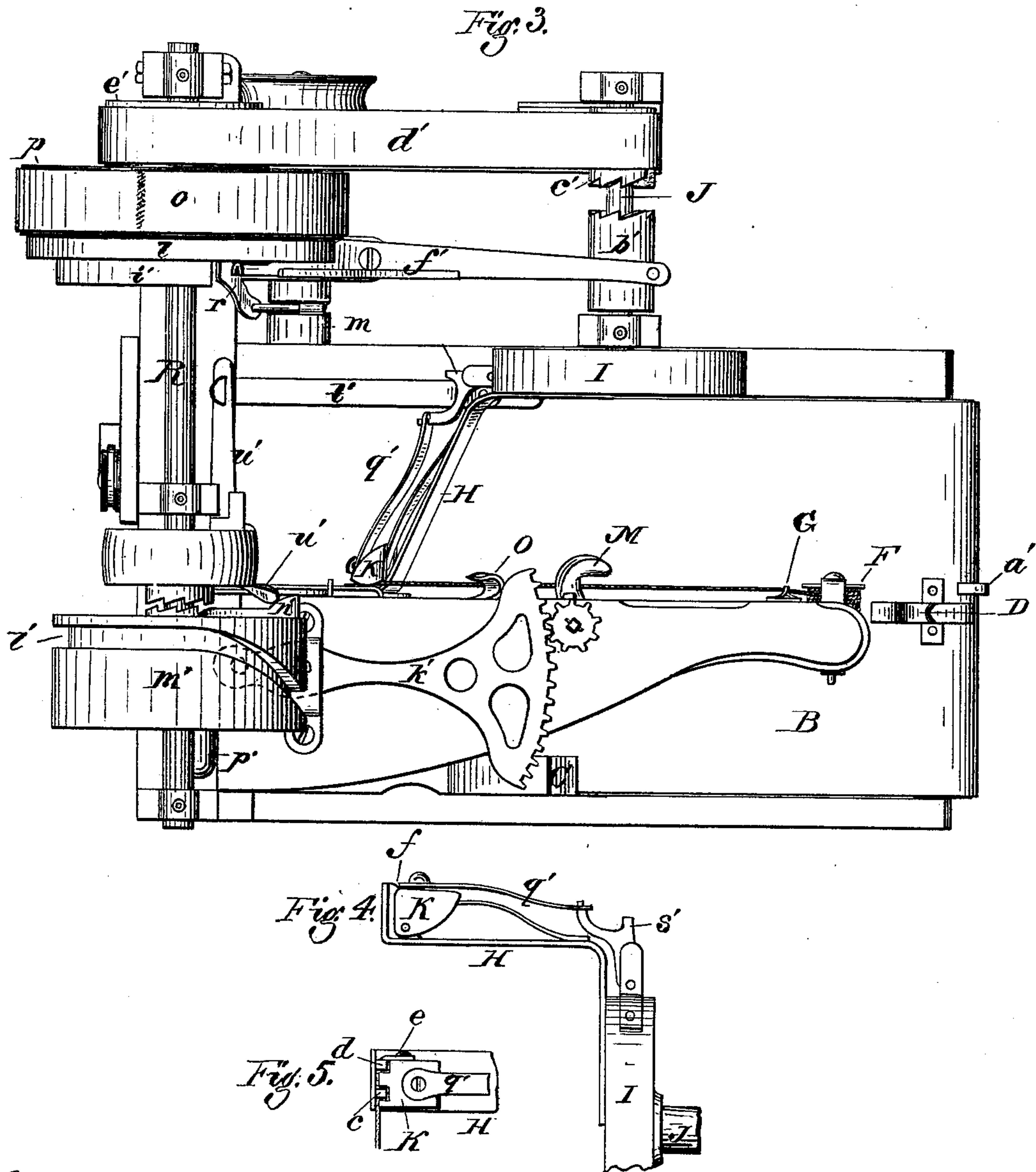
Inventor

J. R. Prescott.  
By his attys.  
Dodge & Son.

J. R. PRESCOTT.  
GRAIN-BINDER.

No. 176,550.

Patented April 25, 1876.



Witnesses:

Will H. Dodge  
Donna Twitchell.

Inventor:

J. R. Prescott.  
By his Atty.  
Dodge & Son.



# UNITED STATES PATENT OFFICE.

JOSEPH R. PRESCOTT, OF RETREAT, WISCONSIN.

## IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **176,550**, dated April 25, 1876; application filed June 24, 1875.

*To all whom it may concern:*

Be it known that I, JOSEPH R. PRESCOTT, of Retreat, in the county of Vernon and State of Wisconsin, have invented certain Improvements in Automatic Grain-Binding Attachments for Reapers, of which the following is a specification:

My invention relates to a combination of mechanism intended to perform automatically the several operations of gathering the grain into bundles, binding them with cord, and discharging them from the machine.

The invention consists in the combination of a fixed receiver and a reciprocating endless belt, provided with an arm for gathering and compressing the grain into bundles; in a crank-arm, arranged in a peculiar manner, for carrying the binding-cord from a stationary spool around the bundle of grain; in a rotary knotting or tying hook of peculiar construction; in clearing and lifting arms to assist the rotary hook in forming the knot; in the construction of a jaw on the end of the crank-arm for holding the cord and severing the same; in the general combination and arrangement of the various parts for joint operation, and in various details, as hereinafter described.

In my machine the grain is delivered in any suitable manner upon an endless reciprocating apron, having an arm which carries the grain forward and compresses it into a bundle in a stationary concave receiver, in which it is held until the completion of the binding operation. While the grain is held in the receiver a jaw attached to the end of a crank draws the cord from a stationary spool and carries it around the bundle of grain, passing the ends over a rotary hook. This hook, which has a pivoted gripping-jaw, makes a partial revolution, and twists the two ends together into the loop, and then, grasping the extreme ends, it turns backward and draws them through the loop, thereby tying them firmly together. The severing of the cord is effected by a jaw on the end of the crank-arm, just previous to the drawing of the ends through the loop. A lifting-arm is arranged to insure the entry of the cord under the jaw of the rotary hook, and another arm is arranged to assist in removing the loop from the hook. After the knot is completed the hook releases

the cord, and the endless apron is moved backward to discharge the bundle from the machine.

Figure 1 represents a side elevation of my machine; Fig. 2, an end elevation of the same; Fig. 3, a top plan view of the same; Fig. 4, a side view of the crank-arm and its head or jaw, by which the cord is carried around the bundle and cut off; Fig. 5, a plan view illustrating the construction of the jaw; Fig. 6, a perspective view of the crank-arm, knotting-hook, spool, and bundle of grain, the cord being passed around the bundle, and the hook about to commence its rotation; Fig. 7, a view of the hook, with the cord thereon, at the commencement of its operation; Fig. 8, a view of the same, with the loop completed, and the ends of the severed cord grasped ready for the backward tying movement; Fig. 9, a view of the same, in the act of completing the knot, the loop being cast off, and the ends drawn through.

In order to avoid confusion and complexity, I will first describe the construction and operation of the binding devices proper, and then the mechanism by which they are actuated.

A represents a strong rigid frame, giving support to all the working parts of the machine; B, a horizontal endless apron, mounted lengthwise in the bottom of the frame, on rollers *a*; C, a stationary concave or receiver, mounted above the inner end of the apron; and D an upright arm attached to the upper side of the apron, for the purpose of gathering the grain, which is delivered on the apron in any suitable manner, and compressing and holding the same in a bundle in the receiver C until the completion of the binding operation. F represents the spool or reel on which the binding-cord is wound, suspended on the under side of a rigid arm above and forward of the receiver C. G represents a rigid guiding-arm by the side of the spool, through which the cord is passed. H represents a crank-arm, carried by a wheel, I, on the end of a horizontal shaft, J, and so arranged that when the bundle of grain is held in the receiver C the rotation of the wheel I will carry the arm around the bundle. K represents a clamping and cutting jaw attached to the end of the crank-arm H, for the double



purpose of carrying the cord around the bundle and of cutting it off at the proper point. As clearly shown in Figs. 4 and 5, the jaw K is hinged to the arm H, and arranged to act against a finger on the end of the same, the finger being provided with two ribs, *c* and *d*, the former entering a recess in the jaw for the purpose of holding the end of the cord, and the latter working closely past a blade, *e*, on the jaw, for the purpose of severing the cord. The inner edges of the two jaws are beveled, as shown at *f*, Fig. 4, for the purposes of forming a groove to receive and retain the cord as the crank-arm rides thereunder at the completion of its circuit around the bundle, and of guiding the cord between the jaws when they are opened. M represents the knotting or tying hook, mounted on the lower end of a vertical shaft directly above the edge of the grain-receiver C. It resembles, in its general form or outline, the letter L, and is provided, as shown, with a pivoted finger, *h*, bearing against the point of the hook, for the purpose of holding the ends of the cord during the formation of the knot. The finger has its upper end extended through the hook, and arranged to bear upon a spring, *i*, and to slide upon a fixed cam, *j*, the former serving to close the finger against the point of the hook, and the latter to raise it therefrom.

O represents a pendent lifter-arm, the curved end of which rises and falls behind the knotting-hook, for the purpose of insuring the entry of the cords under the grasping-finger *h*. P represents a pendent clearer-arm, hung on a rock-shaft and working at its lower end closely against the side of the knotting-hook M, for the purpose of removing the loop therefrom.

In operating the machine the binder-arm is turned over backward in rear of the receiver, in the position shown in Figs. 1, 2, and 3, the knotting-hook adjusted, as shown, with its point across the path of the cord, and the cord passed from the spool, through the guide-arm G, under the hook H, to the jaws on the end of the crank-arm H, as shown. The grain is then delivered upon the apron B, and the apron moved forward until the grain is carried into the receiver C, and compressed into a bundle therein by the arm D. While the bundle is thus held in the receiver, the crank-arm H is caused to make one revolution in the direction indicated by the arrow, carrying the end of the cord around the bundle. As the arm completes its circuit around the bundle, it passes the spool, and, riding under the cord, carries the same over backward, in the manner represented in Fig. 6, the two ends of the portion encircling the bundle being carried across the knotting-hook M, as shown in Figs. 6 and 7. The hook is then rotated toward the left nearly an entire revolution, so as to wind the ends of the cord in a loop around the same, and then the lifter-arm pushes the two ends between the point of the hook and its finger, by which the ends

are firmly grasped, as shown in Fig. 8. The cord is then severed, and the end leading to the spool retained by the jaws on the crank-arm. The hook is next turned backward, and the loop pushed therefrom by the clearer-arm, the two ends being retained under the finger and drawn through the loop, as shown in Fig. 9, thereby producing a secure knot and tying the cord firmly around the bundle. The finger of the hook next releases the ends, the apron moves backward, and the bundle is discharged from the machine.

It is obvious that the binding devices proper may be operated by any suitable arrangement of mechanism, but I prefer the arrangement shown in the drawings and described below, motion being communicated from a single horizontal shaft, R, in one end of the frame to all the working parts of the machine. The endless apron B is driven forward by a sliding clutch, *m*, mounted on the end of one of the rollers *a*, and engaging with a loose pulley, *n*, which is driven by a belt, *o*, from a pulley, *p*, on the main shaft R, as clearly shown in Fig. 2.

The clutch is connected with a lever, *r*, the upper end of which is drawn in one direction by a spring, *s*, and pushed in the opposite direction by a cam, *t*, on the side of the pulley *p*, the arrangement being such that the clutch is alternately thrown in and out of gear at the proper times to advance the apron and its compressing-arm D, and then permit them to move back again. The apron is drawn back when the clutch is released by means of a weighted cord, *a'*, which is attached to the apron just behind the arm D and passed backward and upward over supporting-pulleys, as shown. The compressing-arm is caused to travel up close to the receiver before the release of the driving-clutch, and in order to prevent strain or breakage of the parts in the event of an extra amount of grain or other obstacle preventing the forward movement of the arm, the rim or periphery of the driving-pulley *p* is made separate from its hub or center and arranged to turn thereon with more or less friction, so that the driving-shaft R can continue its motion after the stoppage of the apron and its driving-belt *o*.

With a proper adjustment of parts the employment of the loose rim pulley also admits of the grain being held under compression in the receiver while the cord is being carried around it and the knot formed. The loose rim of the wheel may be applied in any suitable manner, and set-screws, wedges, or other devices employed to regulate the amount of friction between it and the hub or center.

The shaft J, by which the cord-carrying arm H is operated, is provided with a driving-clutch, *b'*, and a loose pulley, *c'*, the latter being driven by a belt, *d'*, from a pulley, *e'*, on the driving-shaft R, as shown. The clutch *b'* is thrown in and out of gear by a lever, *g'*, the upper end of which is drawn to the right by a spring, *h'*, and forced to the left by a



cam,  $v'$ , on the side of a pulley,  $p$ , the arrangement being such that the cord-carrying arm is caused to make a complete revolution at regular intervals. The knotting-hook  $M$  has the upper end of its shaft provided with a pinion, gearing into and driven by a segmental rack on the end of a horizontal lever,  $K'$ , the rear end of which is provided with a stud bearing in a cam-groove  $l'$  formed in the periphery of a wheel,  $m'$ , secured on the main shaft  $R$ .

The lifting-arm  $O$  is pivoted near its upper end and is caused to rise at the lower end by means of a cam,  $n'$ , which is attached to the wheel  $m'$  and arranged to act upon the upper end of the arm, as shown in Figs. 1 and 3.

The clearer-arm  $P$  is attached to a rock-shaft, having at its rear end a crank-arm, which engages with one end of a lever,  $o'$ , which latter is pivoted at the middle, and connected at the opposite end to a vertical slide,  $p'$ , operated by a cam-groove,  $r'$ , in the side of the wheel  $m'$ , as shown in Figs. 1 and 2. The linged clamping and cutting jaw on the crank-arm  $H$  is connected, by a link,  $q'$ , to an elbow-lever,  $s'$ , which is pivoted on the crank-arm, and operated by means of an upright pivoted bar,  $t'$ , in the rear side of the frame. The bar is arranged in such position that, when the crank-arm is at rest, the lever  $s'$  engages thereon, as shown in Fig. 3, and is operated by means of a sliding bar,  $u'$ , which is moved by means of the cam  $n'$  on the wheel  $m'$ , the cam  $n'$  serving, it will be seen, to operate both the cutting and clamping jaw and the lifter-arm.

It is obvious that the machine may be modified in form, as required, to adapt it for application to the different reapers in use; that it may be driven in any convenient manner; and that the grain may be delivered upon the apron  $B$  by any suitable mechanism.

It is also obvious that the various details may be modified without affecting the operation of the other parts; that a different raking and compressing mechanism may be employed; that the rotary hook may have its finger arranged and operated in a different manner; that the parts may be arranged in such manner as to dispense with the clearer and lifter arms; and that, instead of having a fixed spool and a movable carrying and cutting head, the head may be fixed and the spool attached to the rotary arm.

Having described my invention, what I claim is—

1. The combination of the fixed receiver  $C$ , the reciprocating apron  $B$ , and the arm  $D$ , mounted upon the apron, substantially as shown, the apron serving to support the grain and carry the same into the receiver, and the arm to compress and hold the same therein.

2. In combination with the fixed receiver  $C$ , the endless apron  $B$ , provided with the arm  $D$  and weighted cord  $a^1$ , and connected with the driving mechanism in such manner that it is moved forward with a positive motion to advance the arm, and then released, so that it will be instantly returned to its original position by the weight.

3. The combination, in a machine for binding grain with cord, of devices for holding the bundle of grain in a fixed position, a rotary reciprocating tying-hook, mounted in a fixed bearing, a crank-arm, provided with a jaw for taking up, cutting, and retaining the cord, and a cord grasped constantly by said jaw, and passing thence to a guide or spool located in the same vertical plane as the jaw and the tying-hook, substantially as shown and described.

4. In a grain-binding machine, the combination, in the same vertical plane, of a rotary tying-hook,  $M$ , a spool or guide to retain the cord in position, and a jaw,  $K$ , attached to the end of a crank, and arranged to carry the end of the cord around the bundle, and then, while retaining the end, to grasp the cord at a second point, carry the doubled cord across the hook, and, after the formation of the knot, sever the cord and retain the new end produced thereby, as shown and described.

5. The gathering and compressing arm  $D$ , provided with the inclined end  $a^2$ , in combination with the endless apron  $B$ , fixed receiver  $C$ , and shoulder  $b^2$ , as shown.

6. The cord-carrying crank-arm  $H$ , provided with the clamping and cutting jaw  $K$ , constructed and operating substantially as shown and described.

7. In combination with the rotary tying-hook  $M$ , having the pivoted finger  $h$  and spring  $m$ , the stationary cam  $j$ , whereby the finger is raised with a positive motion to admit and release the cord.

8. In combination with the arm  $H$ , provided with the ribs  $c$  and  $d$ , the pivoted jaw  $K$ , provided with the recess and the knife  $e$ , as shown.

9. In combination with the hook  $M$ , operating as described, the lifter-arm  $O$ , substantially as shown.

10. In combination with the rotary knotting-hook  $M$ , the vibrating clearer-arm  $P$ , substantially as shown.

11. In combination with the apron  $B$ , the friction driving-pulley  $p$ , connected therewith by the intermediate parts, provided with the loose band or rim, substantially as shown, and for the purpose described.

JOSEPH R. PRESCOTT.

Witnesses:

JOS. T. K. PLANT,

P. T. DODGE.