

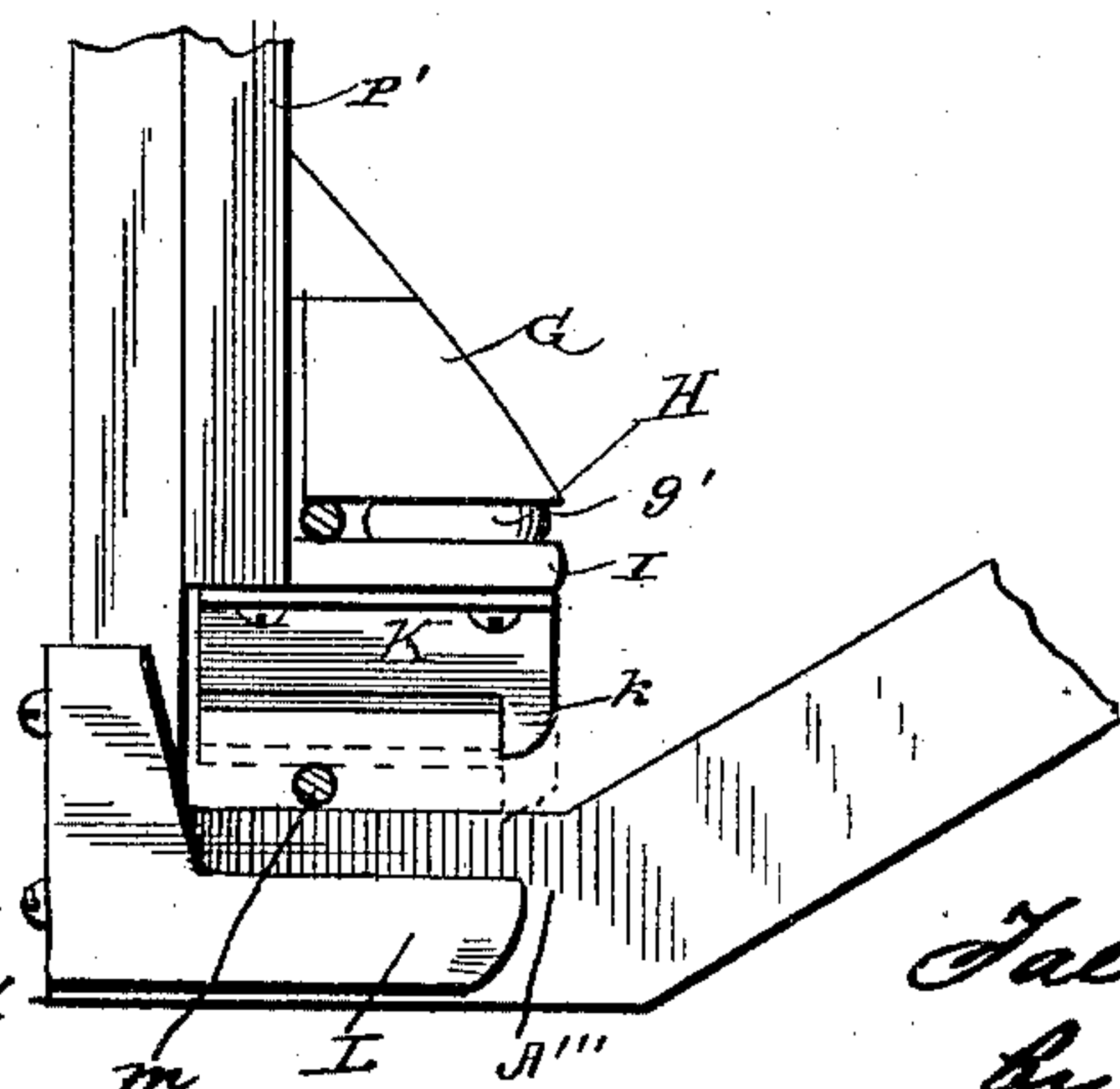
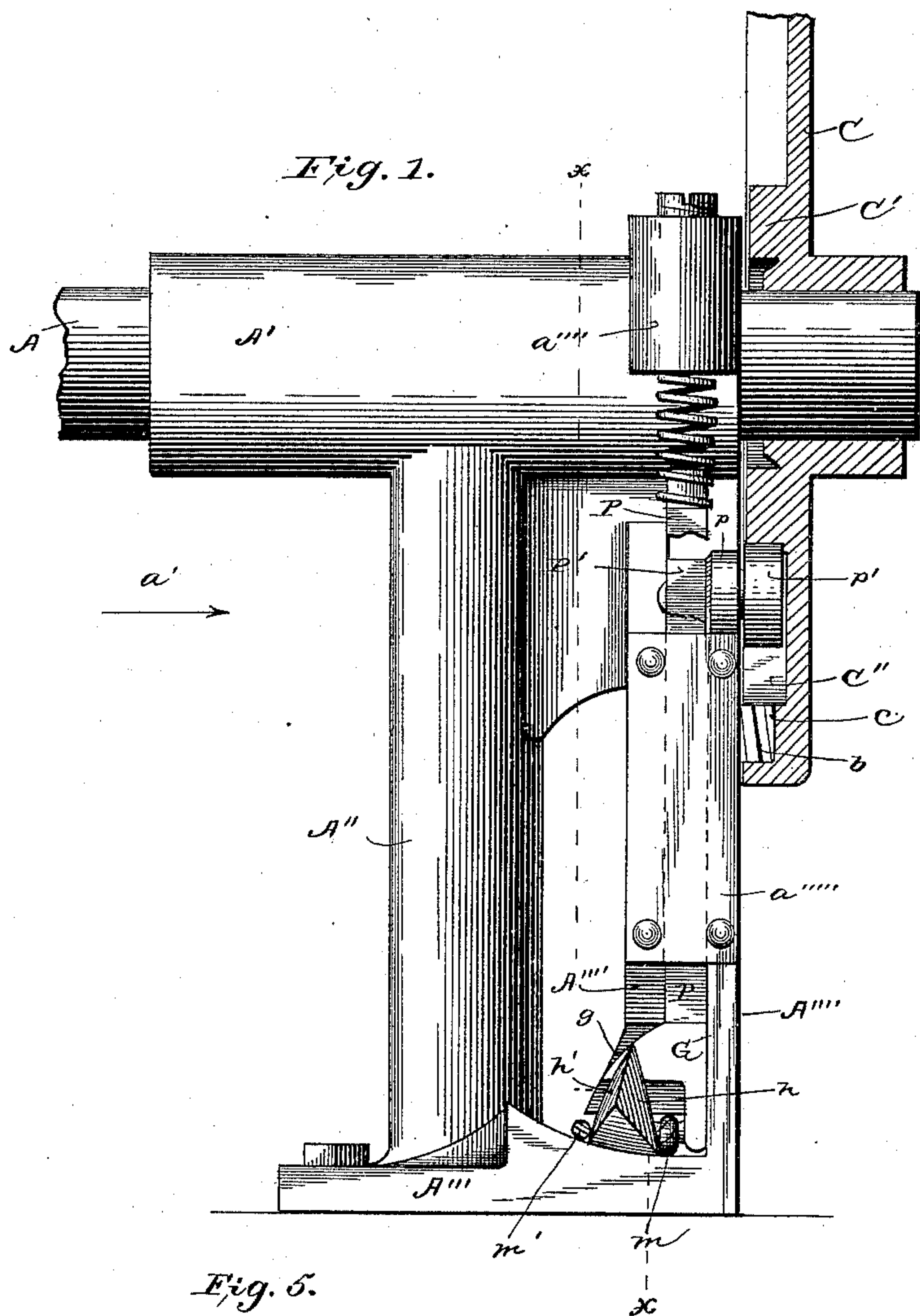
(No Model.)

3 Sheets—Sheet 1.

T. LENNOX.
AUTOMATIC GRAIN BINDER.

No. 445,586.

Patented Feb. 3, 1891.



Witnesses:

Harry S. Polver.

Joseph W. Aman

Inventor:

Inventor:
Salbot Lenny

by *W. H. Allen*

Attorneys.

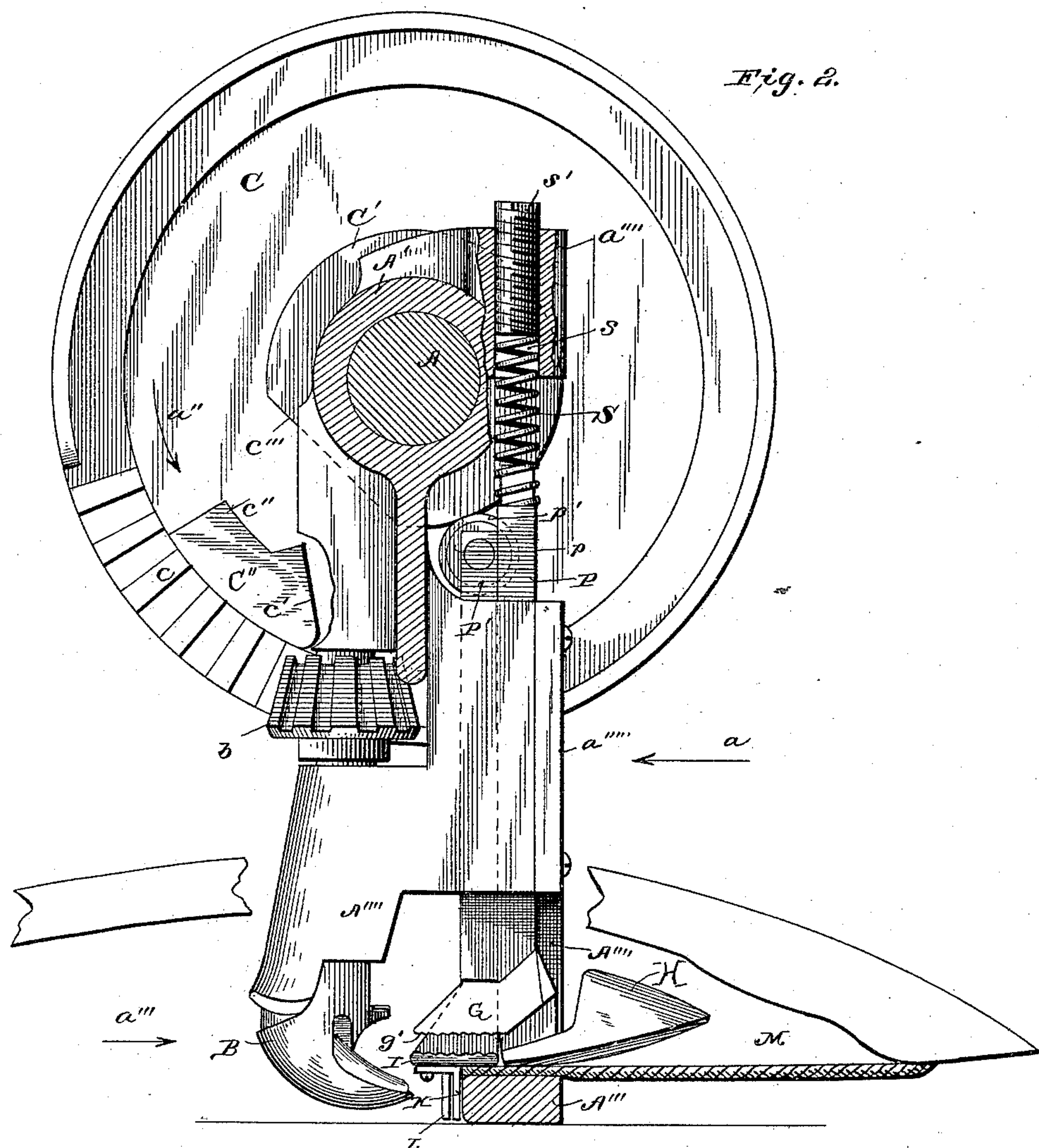
(No Model.)

3 Sheets—Sheet 2.

T. LENNOX.
AUTOMATIC GRAIN BINDER.

No. 445,586.

Patented Feb. 3, 1891.



Witnesses:

Harry S. Rohrer
Jos. W. Aman

Inventor:

Salbot Lemnox
by
Wiles & Greene,
Attorneys,

(No Model.)

3 Sheets—Sheet 3.

T. LENNOX.
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Fig. 3.

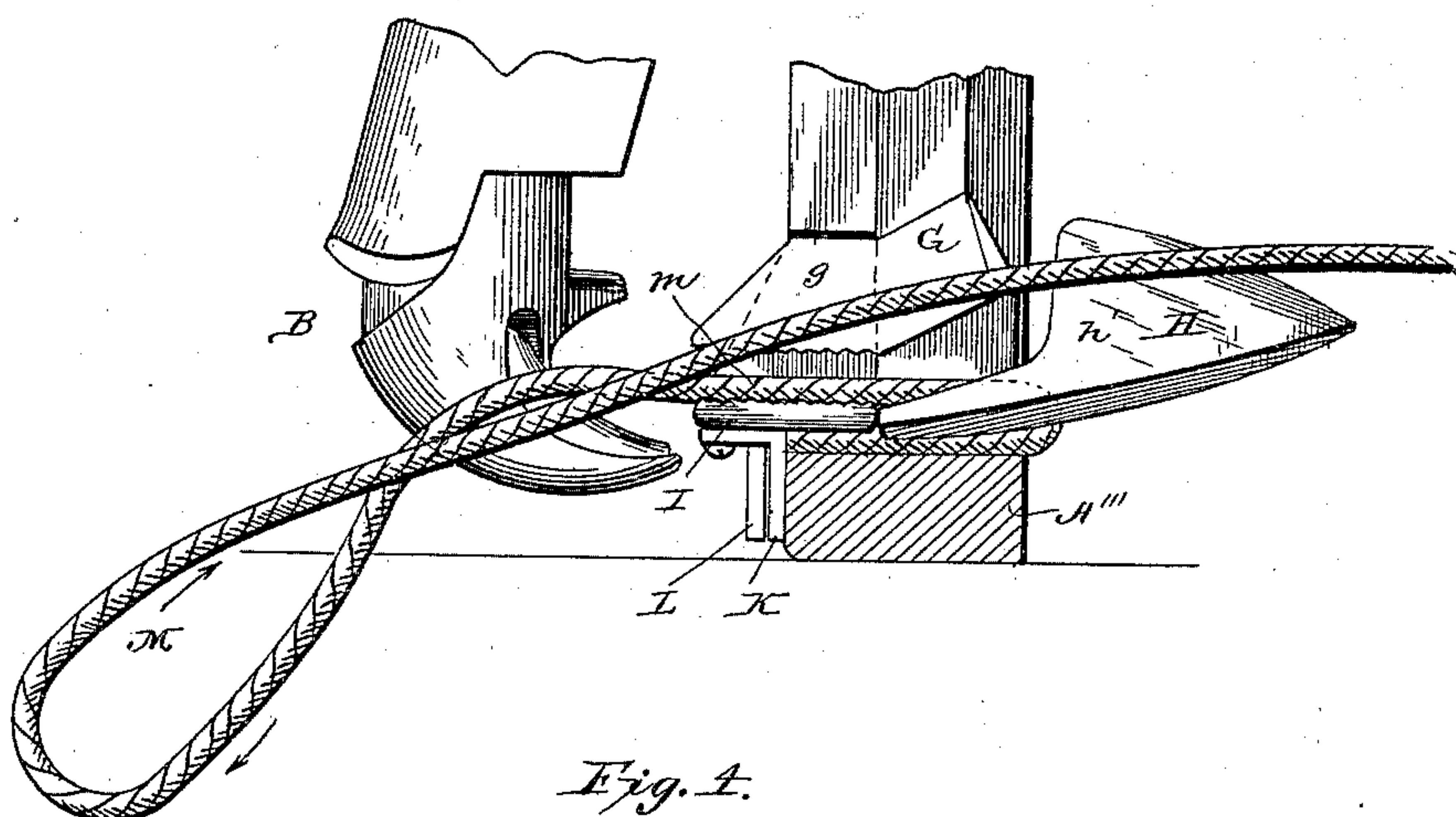
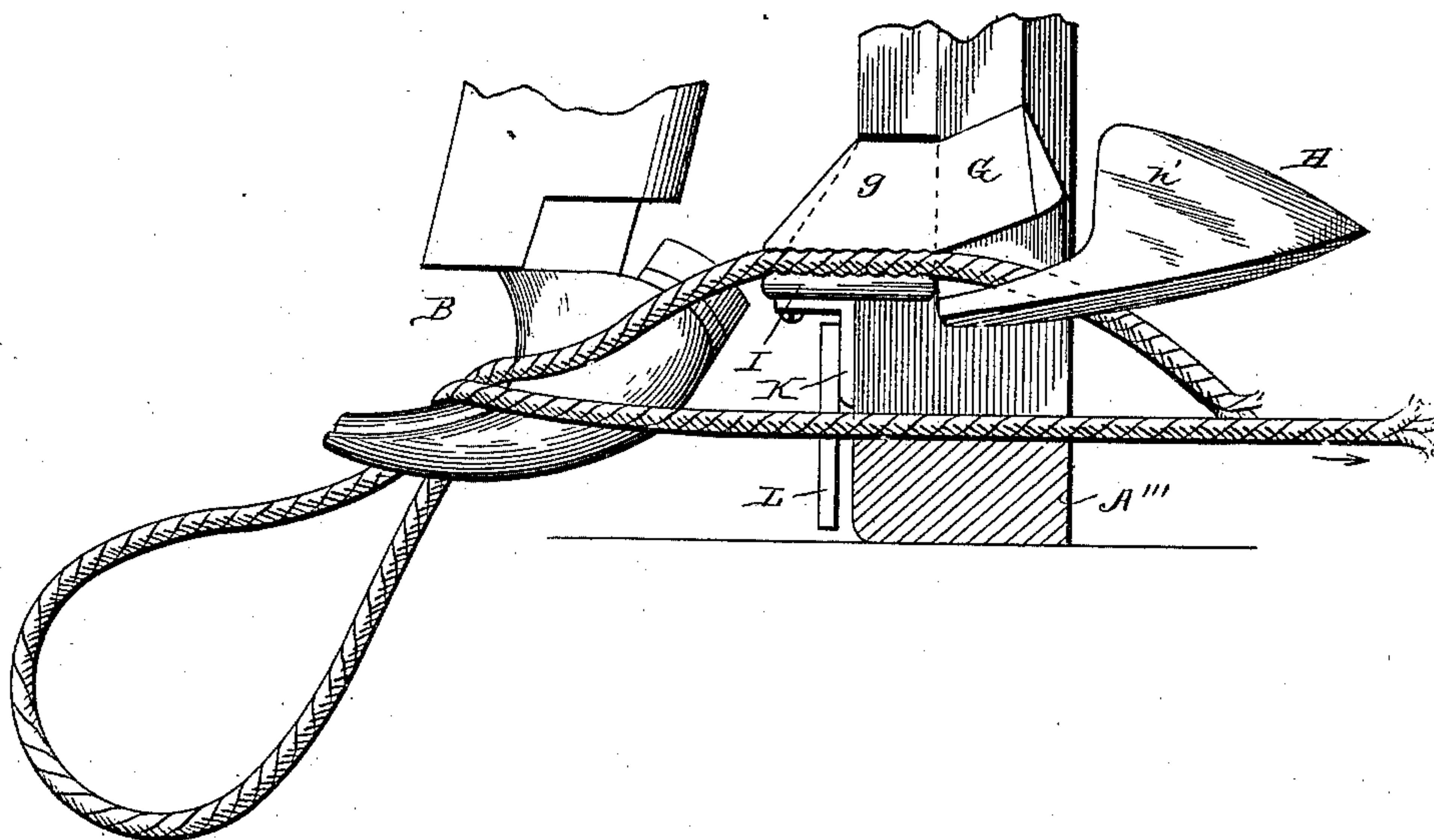


Fig. 4.



Witnesses:

Harry S. Rohrer.
Jos. W. Auman

Inventor:

Talbot Lennox
By Charles H. Kane,
Attorneys.

UNITED STATES PATENT OFFICE.

TALBOT LENNOX, OF MARSHALLTOWN, IOWA.

AUTOMATIC GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 445,586, dated February 3, 1891.

Application filed April 22, 1890. Serial No. 348,995. (No model.)

To all whom it may concern:

Be it known that I, TALBOT LENNOX, a resident of Marshalltown, in the county of Marshall and State of Iowa, have invented certain new and useful Improvements in Automatic Grain-Binders; 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 pertains to make and use the same.

My invention relates to improvements in cord-holding devices for automatic grain-binders, and is fully described and explained in this specification, and shown in the accompanying drawings, in which—

Figure 1 is a view, partly in side elevation and partly in vertical section, of a knot-tying device embodying my improvements, the view being in the direction indicated by the arrow *a* in Fig. 2. Fig. 2 is a view, partly in elevation and partly in vertical section, illustrating the same device, the view being in the direction indicated by the arrow *a'*, Fig. 1. Figs. 3 and 4 are elevations illustrating the operation of the device, the view in each of said figures being in the direction indicated by the arrow *a'*, Fig. 1. Fig. 5 is an elevation looking in the direction indicated by the arrow *a''*, Fig. 2, showing the knife for severing the cord, together with the parts immediately connected therewith.

In the views, *A* is the knotter-shaft of a grain-binder of ordinary construction.

A' is a box or bearing in which the shaft is supported; *A''*, a post or column supporting the bearing; *A'''*, a base or foot supporting the post, and *A''''* a standard supported by the base and joined at its upper end to the box *A'*, the parts *A' A'' A''' A''''* being preferably cast in a single piece.

B is a knotter of ordinary construction, provided with an approximately vertical shaft seated in a suitable bearing in the frame already described, and having on its upper end the usual beveled pinion *b*, which is driven by teeth *c* upon the driving-wheel *C*, mounted upon the shaft *A* in the ordinary manner.

In the upright *A''''* are seated two longitudinally-reciprocating plungers *P P'*, lying side by side in a suitable groove or guide in the standard and held in place by a plate *a''''*, bolted to the standard. On the lower

end of the plunger *P* is formed a horn *H*, extending outward or away from the knotter in a line approximately parallel to the path of the needle of the binder; and above the point of connection of the horn with the plunger is a bevel-faced guide *G*, also formed integrally with the plunger and having a preferably roughened or serrated lower face or base *g'*. A spring *S* rests upon the upper end of the plunger *P*, the upper end of the spring being seated in a socket *s*, formed in the lower end of the boss *a''''* on the bearing *A'*, the upper end of the socket being screw-threaded and provided with a screw *s'*, by means of which the spring may be compressed for the purpose of regulating the force with which it presses downward the plunger *P*. By means of this spring the lower face of the horn *H* is held normally in close engagement with the foot or base *A'''* on which it rests, as shown in Fig. 2.

The plunger *P'*, which lies beside the plunger *P*, is provided at its lower end with a foot *I*, lying below the guide *G* and normally separated from it by a considerable space, as shown in Fig. 2, the upper face of the foot being preferably roughened or corrugated. The upper end of the plunger *P'* has on its outer face a cylindrical hub *p*, and a roller *p'* is mounted on a gudgeon projecting from the center of said hub and lying in the plane of the rim of the driving-wheel *C*. A cam *C'*, Fig. 2, concentric with the driving-wheel *C* and formed integrally therewith, forms very nearly a complete circle about the axis of the wheel, and is of such diameter that during the greater part of each rotation of the wheel the circumference of the cam is in contact with the roller *p'*, attached to the plunger *P'*, and holds the plunger in the position shown in Fig. 2, the lower face of the foot *I* of the plunger being very nearly in contact with the base *A'''*. A second cam *C''*, formed on the driving-wheel, lies just within the inner margin of the teeth *c* and has an oblique face *c'* and a circumferential inner margin *c''*, the oblique face *c'* being adapted to raise the roller *p'* and plunger *P'* at the moment when the cam *C'* is out of contact with the roller, and the face or edge *c''* being so placed as to pass under the roller and hold the plunger *P'* in a partly-raised position during a certain portion of the rota-

tion of the wheel. The objects attained by the actions of the cams C' C'' upon the plunger P' will be more fully explained hereinafter in the description of the operation of the device.

A vertical knife K is fastened to the lower face of the foot I and lies in contact with the inner face or edge of the base A''' and between said base and a knife-guide L , attached thereto, the knife K being provided at its outer end with a hook k , whose office is hereinafter explained.

When it is desired to operate the device thus shown and described, the needle is threaded and raised to the position shown in Fig. 2 and the free end of the cord M is placed under the horn H and between it and the foot or base A''' , the pressure of the spring S upon the plunger P being sufficient to clamp the end of the cord securely between the lower face of the horn and the upper face of the base. The needle is then moved backward and downward, carrying the cord along the face h of the horn H and along the face g of the oblique-faced guide G until at the end of the backward and downward stroke of the needle the cord lies in the space between the lower face of the guide G and the upper face of the foot I , as indicated at m in Figs. 1 and 3. The same movement of the needle carries the cord across the bill of the knotter and holds it at a point below and in the rear of the knotter during the formation of the bundle. The needle then moves forward and upward, carrying the cord again across the knotter and along the face h' of the horn H in approximately the line indicated in Fig. 3, this movement of the needle being continued until its point reaches the position shown in Fig. 2, when the cord rests upon the upper face of the base A''' in the position indicated in section at m' , Fig. 1. The cord being in this position and the knotter being in the position shown in Figs. 1 and 3, the teeth c of the driving-wheel engage the pinion on the knotter and give it a complete rotation for the purpose of forming a knot in the usual manner. When the knotter has made about one-third of a revolution and is in the position indicated in Fig. 4, the oblique face c' of the cam C'' of the driving-wheel strikes and lifts up the roller p' and raises the plunger P' until the knife K , with its hook k , is raised completely above the base A''' , as indicated in Fig. 5. In this upward motion of the plunger P the foot I strikes the lower face of the guide G on the plunger P , and thereby raises the plunger P and its attachments to the position shown in Fig. 4, the part m of the cord being clamped securely between the foot I and the guide G , and the end of the cord being released by the raising of the horn H from the base A'' , as shown in Fig. 4. At the instant that the plungers P P' are raised to the position shown in Figs. 4 and 5 the body of the cord, which has been drawn taut in the movement of the needle, slips under

the horn H and foot I to the position shown in section at m' , Fig. 5, and immediately after the cord has reached this position the roller p' on the plunger P drops down upon the edge c'' of the cam C'' , thus permitting the plungers to drop until the hook k of the knife K extends below the upper edge of the base A''' in the position shown in the dotted lines in Fig. 5, and securing the cord against accidental escape from its position. This dropping of the plungers P P' brings the space between the foot I and guide G to a plane only slightly above the end of the bill of the knotter, so that in the latter part of the rotation of the knotter, when the tongue of the knotter is raised, the tongue passes above and the end of the bill below the edge of the clamp formed by the foot I and guide G , and when the rotation of the knotter is completed and the tongue closed upon the bill and upon the cord which lies between them the end of the bill is very near to the edge of the foot I and guide G , and the end of the cord held by the foot and guide is only a very short distance from the end of the bill. At the instant after the rotation of the knotter is completed, the roller p' is released from the cam C'' , and the plungers drop down to the positions shown in Fig. 2, the part of the cord shown at m' , Fig. 5, being clamped between the lower face of the horn H and the upper face of the base A''' . The downward pressure of the spring S upon the plunger P , and through it upon the plunger P' , is usually sufficient to cause the knife K to sever the cord; but in any case the cam C' strikes the roller immediately after its release from the cam C'' and forces the plunger P' downward with a positive pressure which insures the severing of the cord and also insures the release of the end of the cord which has been clamped between the foot I and the guide. The cord being severed and the end formerly held being released, the bundle is free to be discharged in the ordinary way, and the operation of forming a knot is thus completed and the machine is ready for a second operation.

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

1. The combination, with the knotter and a stationary base A''' , of a reciprocating plunger P , provided with the guide G and horn H , a second reciprocating plunger P' , provided with a foot I , and means, substantially as shown and described, for operating said plungers, whereby during a part of each rotation of the knotter the lower face of the horn H is pressed upon the base A''' and during the remainder of such rotation the upper face of the foot I is pressed upon the lower face of the foot G , thereby forming two alternately-operating cord-clamps, substantially as and for the purpose set forth.

2. The combination, with the knotter and the reciprocating needle, of the plunger P ,

provided with the horn H, having the oblique face *h*, and the guide G, having the oblique face *g* inclined in the direction opposite to the face *h* of the horn, whereby during the backward movement of the needle the cord is guided by the faces *g h* in its downward movement and passes under the horizontal face of the guide G, substantially as and for the purpose set forth.

3. The combination, with the plunger P, having the guide G and horn H, of the plunger P', having the foot I and roller *p'*, the spring S, adapted to press downward the plunger P, and the driving-wheel C, having the cam C', adapted to engage the roller *p'* and raise the plungers at a predetermined time during each rotation of the wheel, substantially as and for the purpose set forth.

4. The combination, with the plunger P, having the guide G and horn H, of the plunger P', provided with the foot I and knife K, said knife being provided with a hook *k*, adapted

to prevent the escape of the cord when once under the knife, substantially as and for the purpose set forth.

5. The combination, with the knotter, of the plunger P, having the guide G, and the plunger P', having the foot I, adapted to be pressed against the lower face of the guide G to form a cord-clamp, the two jaws of said clamp being beveled toward the knotter, whereby in the rotation of the knotter the bill and tongue thereof may pass respectively below and above the edge of said clamp, thereby reducing the necessary space between the knotter and cord-clamp, substantially as and for the purpose set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

TALBOT LENNOX.

Witnesses:

ALFRED ZAPF,
J. A. CRAIN.