

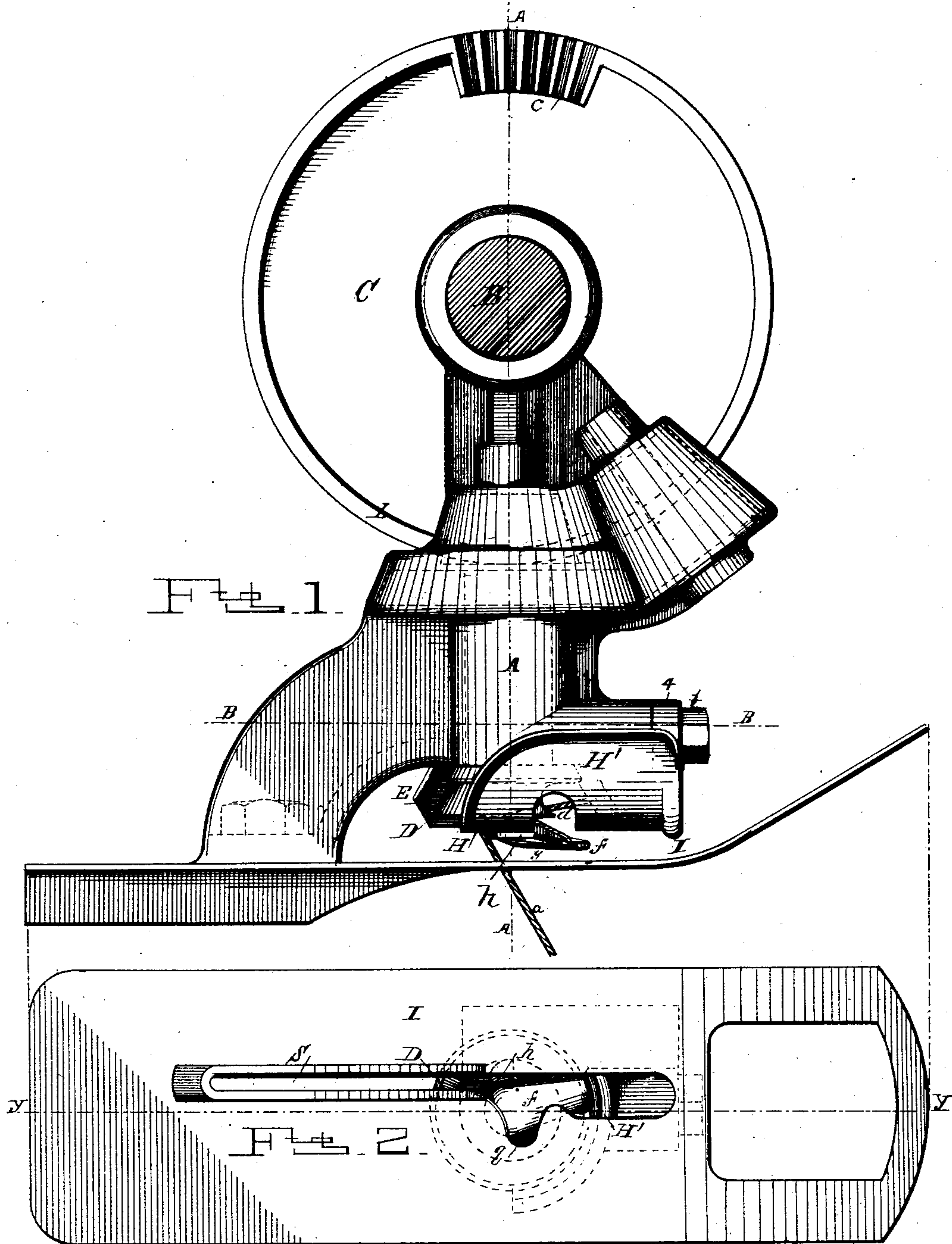
(No Model.)

6 Sheets—Sheet 1.

M. A. KELLER.
CORD KNOTTER FOR HARVESTING MACHINES.

No. 525,463.

Patented Sept. 4, 1894.



Witnesses:
J. R. Keller
E. M. Keller

Inventor.
M. A. Keller.

(No Model.)

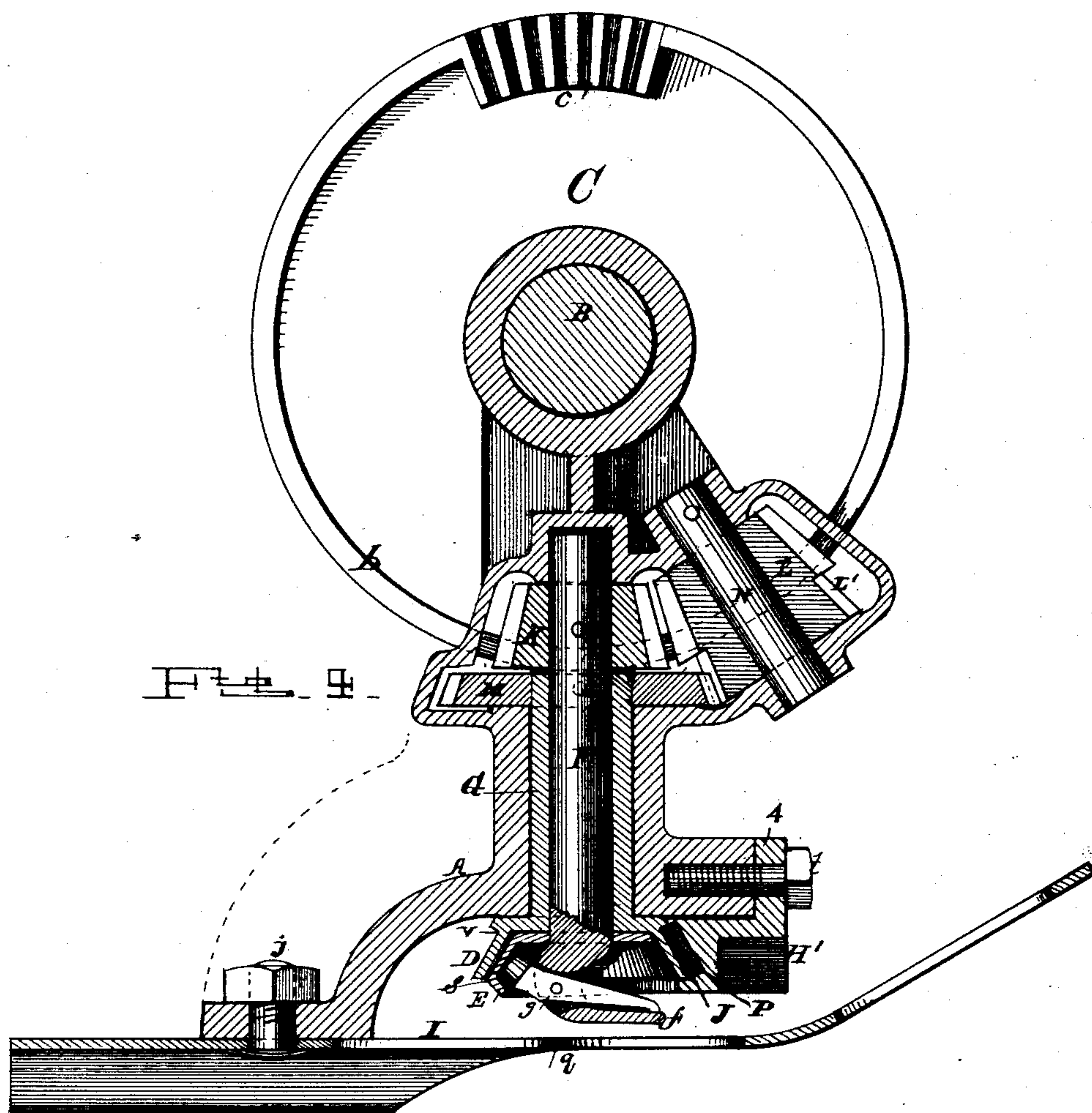
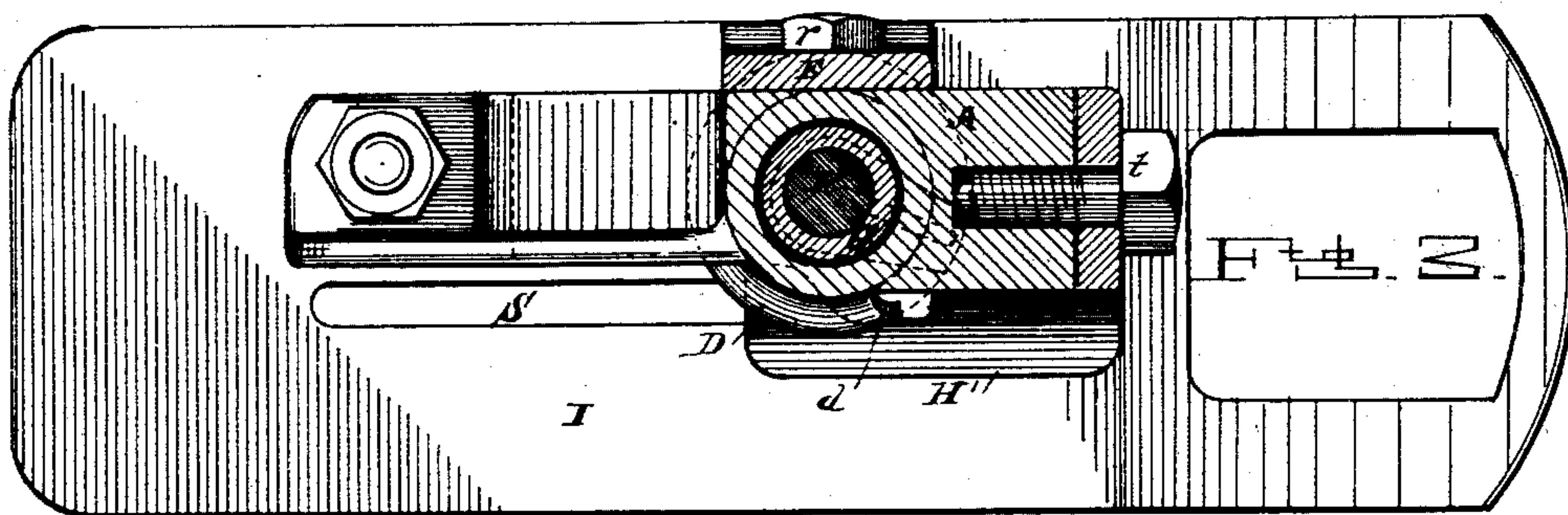
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J. R. Keller
S. M. Keller

Inventor _____

M. A. Keller

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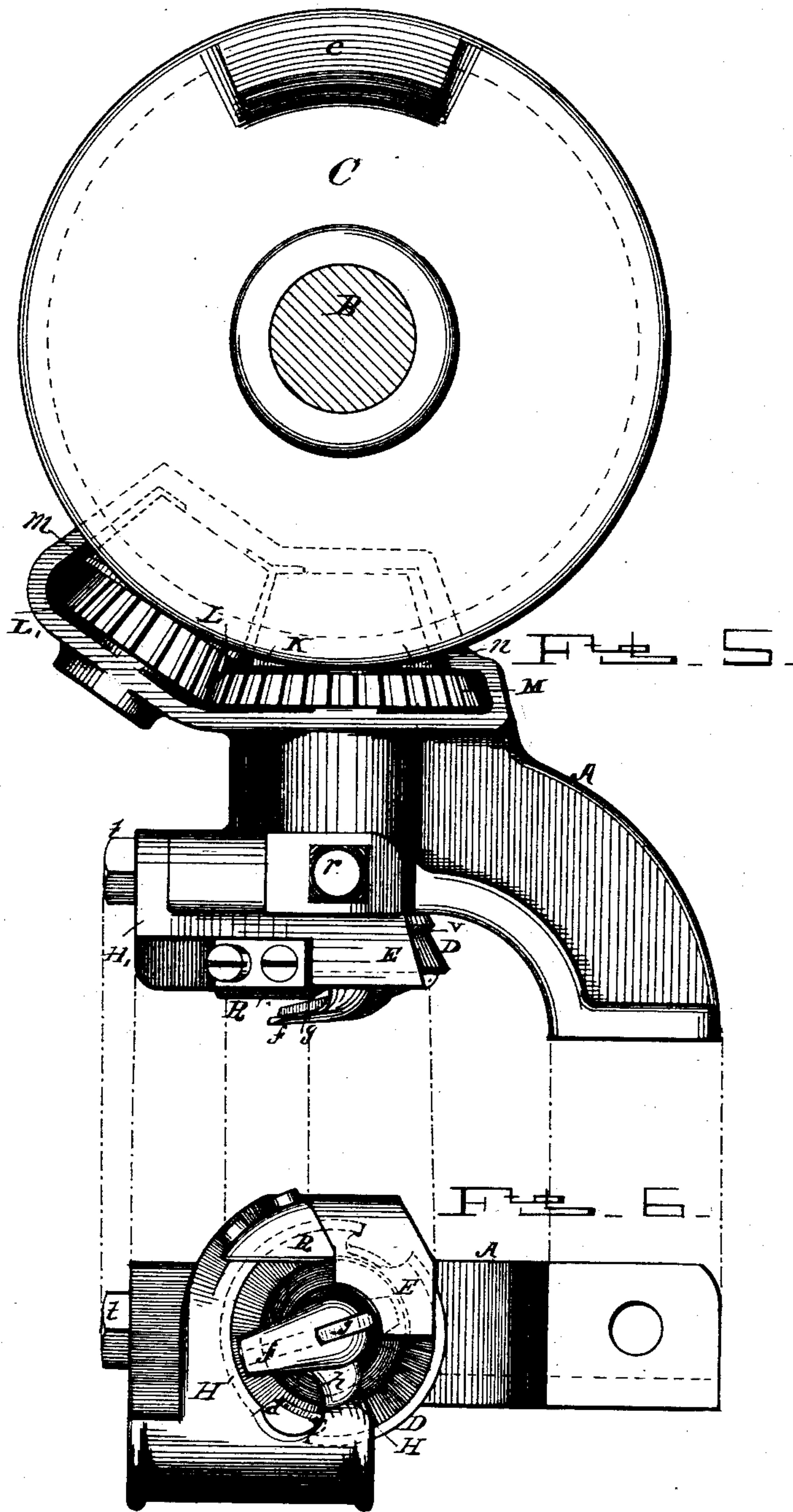
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C. M. Keller.

Inventor.

M. A. Keller.

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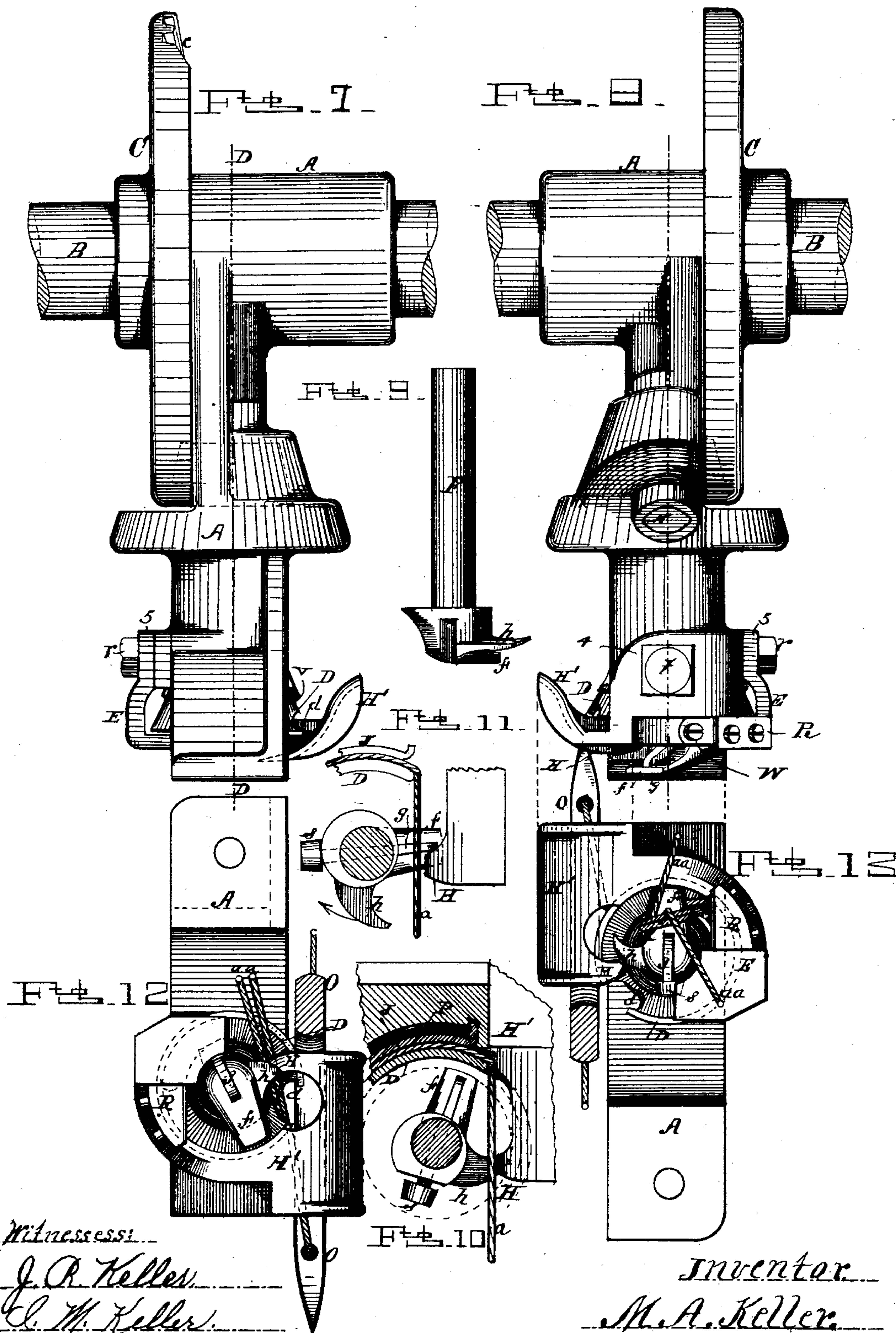
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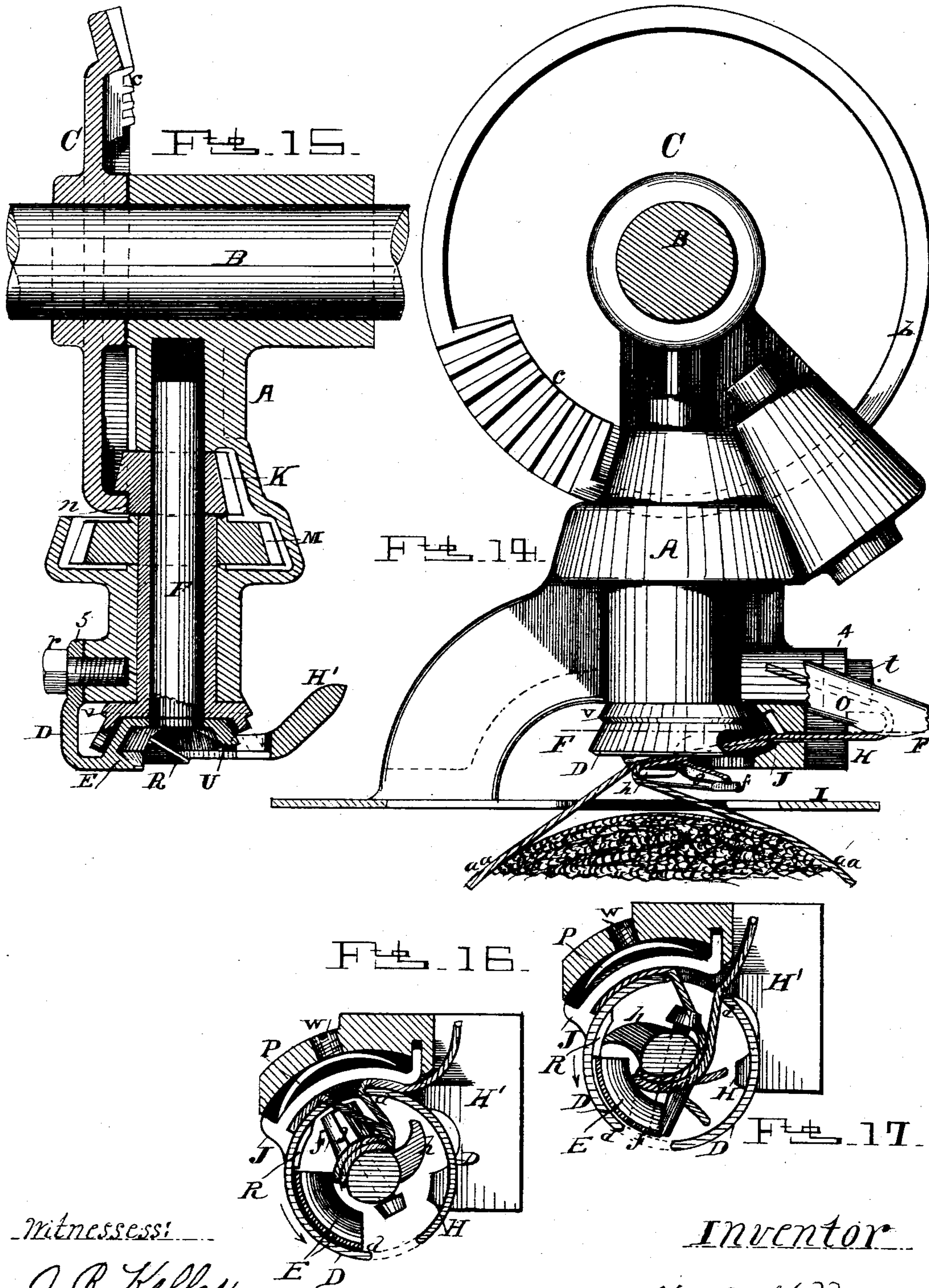
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L. M. Keller

Inventor

M. A. Keller

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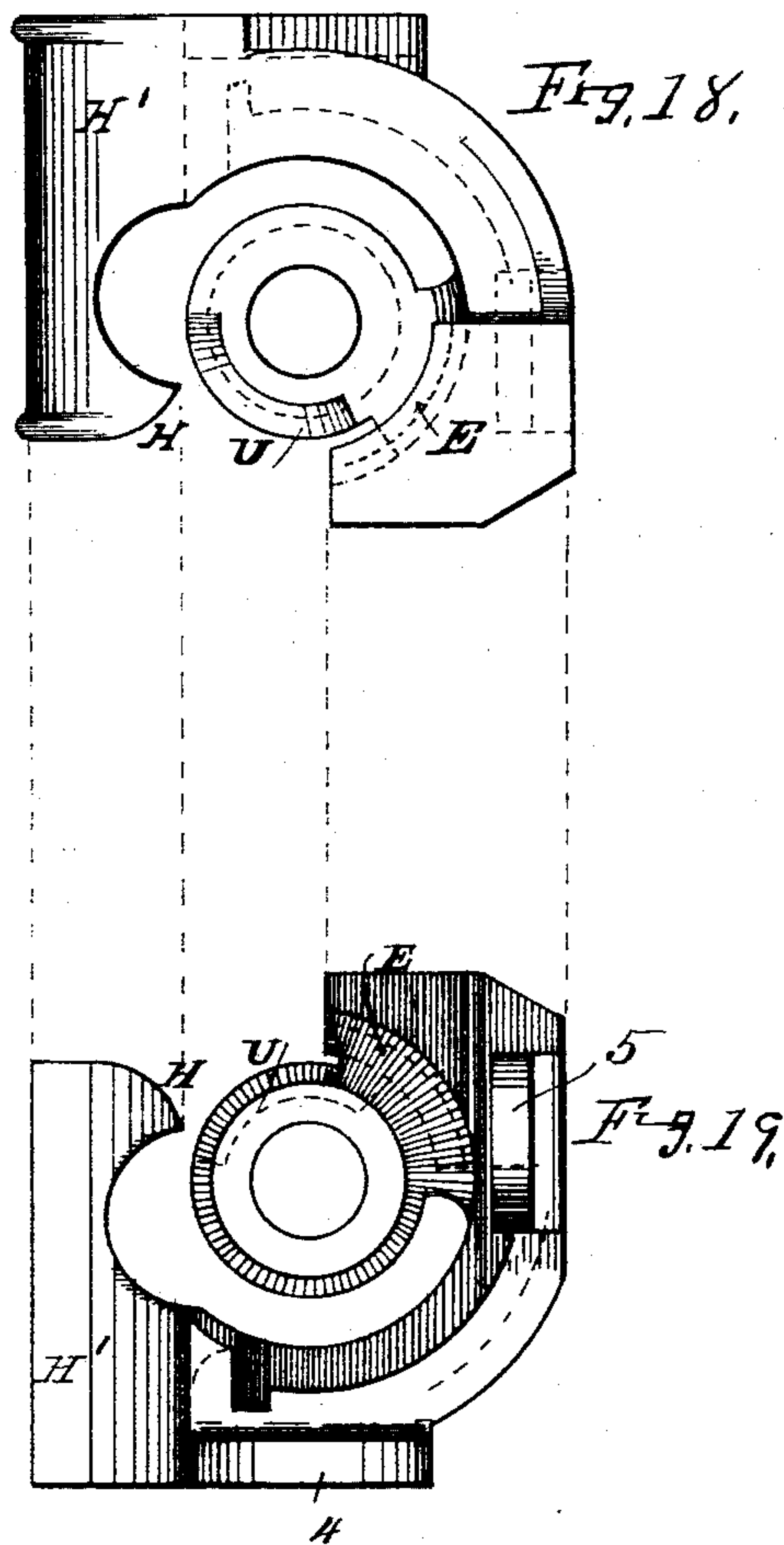
6 Sheets—Sheet 6.

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No. 525,463.

Patented Sept. 4, 1894.



WITNESSES:

L. Schaeffer.
W. A. Richison

INVENTOR

M. A. Keller.

UNITED STATES PATENT OFFICE

MOSES A. KELLER, OF BATAVIA, NEW YORK.

CORD-KNOTTER FOR HARVESTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 525,463, dated September 4, 1894.

Application filed April 25, 1892. Serial No. 430,616. (No model.)

To all whom it may concern:

Be it known that I, MOSES A. KELLER, a citizen of the United States, residing at Batavia, in the county of Genesee and State of New York, have invented a new and useful Improvement in Cord-Knotters for Harvesting-Machines, of which the following is a specification.

My invention relates to improvements in which a rotary cord holder is journaled about a rotary knotter, and it relates further to various other improvements in combination with said cord holder and knotter, all of which I attain by the mechanism illustrated in the accompanying drawings, in which—

Figure 1, is a right hand side view with all its operating parts in their normal position. Fig. 2, is a bottom plan of Fig. 1. Fig. 3, is a sectional view taken through the line B. B. of Fig. 1, showing the top of the cord guide and the breast-plate, and a portion of the cord holder in its normal position. Fig. 4 is a vertical sectional view taken through the lines D, D, of Fig. 7 and line Y, Y, of Fig. 2. Fig. 5, is a left hand side view, and Fig. 6, is a bottom plan of Fig. 5, with the working parts all in their normal position. Fig. 7, is a front side view, and Fig. 8, a rear side view. Fig. 9, is a rear side view of the knotter, separated from the frame. Figs. 10. and 11. are sectional detail views. Fig. 12 is a bottom plan of Fig. 7, but with cord and point of binding needle in position just at the point where the looping jaws begin to start, and Fig. 13, is a bottom plan of Fig. 8, which is identical with Fig. 12, but shows the position of the cord on the looping jaws as the same appears at the point where the ends of the cord forming the band are drawn between the jaws and just at the point where the jaws begin to close on the cord. Fig. 14, is a right hand side view with a portion of the cord guide removed to show the position of the cord just at the time the looping operation begins. Fig. 15, is a vertical sectional view taken through the line A. A. of Fig. 1, with the looping jaws removed from the knotter spindle to better show the construction and position of the cam that controls the pivoted looping jaw. Figs. 16. and 17. are sectional views of the looping and cord holding mechanism taken through the line F. F. of Fig. 14, and

Fig. 18 is a bottom plan of the combined cam plate and cord guide, and which forms the housing for the cord holder cup, and clamping shoe, and as the same appears when detached from the knotter frame and other parts, and Fig. 19 is a view of the reverse side of same plate as Fig. 18.

Similar letters refer to similar parts throughout the several views.

The main frame A. is bolted by the bolt *j*, to the breast plate I, as shown in Fig. 4. Journaled in its upper end is the main operating shaft B, to which is affixed the knotter operating wheel C, and thereby is caused to rotate with the shaft, and gives motion to all the knotting mechanisms as will be shown hereinafter. The sleeve G. of the cord holder, and the knotter spindle F. are journaled in the main frame, transversely to the shaft B, but the spindle F, is journaled in the sleeve G, so that its motion is independent of the sleeve. A pinion K, is rigidly secured upon the spindle F, near its upper end as shown in Fig. 4. This pinion has just enough cogs to correspond with the cogs *c* on the face of the wheel C, to cause it to make one complete revolution to one revolution of the wheel C, no more no less, and is locked in its normal position by the flange *b*, that is on the face of the wheel C, which bears against a delay surface *n*, formed on the pinion see Fig. 5, and 15. The pinion M. is secured to the sleeve G. at the upper end as seen in Fig. 4, and at the lower end of the sleeve is formed the crown shaped cord holder D. A supplemental double pinion L, is journaled upon the spindle N, at the rear of the frame, and its upper portion has just as many cogs as pinion K, and is engaged and rotated by the same segment cogs *c*, of the wheel C, and therefore makes but one complete revolution, to one revolution of wheel C, and is locked in its normal position in the same way as is the pinion K, by a delay surface *m*. The pinion M. has twice as many cogs as there are cogs *L'*, on pinion L, and gears with said cogs *L'*. By this construction it will be seen that the pinion M, is rotated by the pinion L, and makes therefore but one half revolution, to one complete revolution of the pinion L, thereby giving one half revolution to the cord holder D, to each tying operation, and in the opposite

direction to the rotation of the knotter. The object of this construction is, to do away with the usual knot stripper arm by having the looping jaws stand in the direction of the discharge of the bundle, while in their normal position as seen in Figs. 1, and 2, so that the loop is pulled off the jaws as the bound bundle is discharged, but while the jaws of the knotter must stand in this position to allow the loop to pull off, it was with no little difficulty to get the ends of the cord forming the band between the opened jaws in time and draw them in far enough, before the jaws must close, but this difficulty is entirely overcome by the cord holder journaled concentric with the knotter spindle, and rotating in the opposite direction to the knotter, and thereby positively draw the cord between the jaws as will be fully pointed out farther on.

The combined cam plate, which is shown by the drawings Figs. 18 and 19 forms the cams E U and the cord guide H', and cord finger H, and these parts thus become all integral. This plate also forms a housing on the rear side of the cord holder cup, into which are arranged the cord clamping shoe J and its spring P, as seen in Figs. 16 and 17, the lugs 4 and 5, form means by which the plate is bolted unto the frame A, by the bolts *t* and *r*, the cam part U, fits down into the cord holder cup D, as seen in the sectional view Fig. 15, and is provided with a hole concentric or in line with the hole in the sleeve of the cord holder cup, through which passes the knotter spindle, and when the knotter is in its place and rotated the little roller on the pivoted knotter jaw, alternately comes in collision with the cams U and E, and thereby the looping jaws are opened and closed at the proper time.

In order that the rift S, in the breast-plate may be unobstructed by a cord rest, I have formed a cord rest *h*, on the base of the looping jaw *f*, as shown in Fig. 14, and several others, and have provided a cord guide H, to guide the cord unto the finger or rest, the peculiar construction and shape of the rest *h*, allows the cord to slip off, and drop onto the looping jaws *f* and *g*, as soon as the same are in a position or at right angle to the cord, see Fig. 11, thus doing away with the stationary rest over the rift in the breast-plate, and making absolutely sure of the cord being secured by the looping jaws. The cam plate forms a circular recess at its lower edge, on which the cord holder cup bears, see Fig. 4, and also forms a recess for the cord clamp J. and spring P, see Figs. 16 and 17, and a tension screw W. is threaded in said plate to regulate the proper amount of tension to hold the cord against the cup D. A flange V. is formed at the base of the cup to prevent the cord from getting up in the bearing, and to form a guide for the clamp J. The crown shaped cup D. is provided with two (2) cord holding notches *d*, to secure the cord and carry it around un-

der the clamp J. between the cup and said clamp and between the looping jaws.

The knife R. for cutting the cord is secured to the plate H', by two screws or equivalent means in the manner shown in the several drawings, and its cutting edge is turned down over the flange of the cord holder cup until it bears against the inside of the notched part of the flange and thereby forming in conjunction with the notched flange a shear cutter as the cord holder cup rotates and carries the cord against the knife in the manner hereinafter more fully described. There is a notch *q* formed in the breast-plate I, the walls of which prevent the cord from slipping off the looping jaws until the latter are come to their normal position.

The operation of the mechanism as a whole, while tying a knot, is as follows: The normal position of the knotter, with one end of the binding cord, is shown in Figs. 1, and 10. When the needle, O, has placed the cord around the grain or gavel the other end of the cord forming the band is also brought in the same position on the cord rest *h*, as shown in Figs. 14, and 12. While the needle was thus in motion the knotter operating wheel C, has also been set in motion and is now in the position shown in Fig. 14. The cogs *c*, will now fall in gear with the knotter operating pinion K, and set in motion the looping jaws *f* and *g*, and as soon as the cord rest *h*, has moved past the cord guide H, the cord drops unto the looping jaws, as shown in Fig. 11, but there will be two strands of the cord instead of but one as seen in said figure, and when the looping jaws have thus secured the cord, the cogs, *c*, of wheel C, now fall in gear with the pinion L, and start thereby the cord holder cup D, which turns in the opposite direction to the looping jaws. See arrow points Fig. 17. The end of the cord held by the holder is not carried around with the holder cup but as the holder rotates it pays out the cord to the knotter, while the other strand of the cord is caught by the notch *d*, and carried around and clamped between the periphery of the cup D, and clamp J, as seen in Figs. 17, and 16. In Fig. 16, the looping jaws are in position and separated to allow the cord holder to draw the ends of the cord between the jaws and when the latter have reached the point shown in Fig. 13, the loop is completed and the jaw *g*, is closed upon the ends of the cord by the roller *s* coming in collision with the cam E, as seen in Fig. 13, and as soon as said jaws are closed, the holder cup carries the cord against the knife R, see Fig. 13, and thus severs the cord while the old end is released, and as the cogs *c*, pass out of gear with the pinion L, the holder cup has reached its normal position and the loop of the applied band pulls off the jaws and completes the knot as the bound bundle is carried out by the ejecting mechanism. In the mean time the binding needle has also returned to its

normal position and again placed the cord on the cord rest *h*, as seen in Figs. 1, and 10, and the cord is now in position to receive the grain for the next bundle.

5 The ends of the cord *a a*, in Figs. 12, 13, and 14 represent the band that would be around the bundle while the knotter is in operation tying the knot.

10 Having thus fully described the construction and operation of my mechanism, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In a knotting mechanism for grain binders, a rotary knotter, combined with an intermittently rotating cord holder journaled on the knotter spindle and rotating in the direction opposite to the knotter, and having a crown shaped cup overhanging the knotter jaws, cord holding notches formed in the 20 flange of said cup, a stationary guide to conduct the cord into the notches, a yielding cooperating clamping shoe to confine the cord into said notches and clamp the same upon the outside of the periphery of the holder cup, 25 a stationary cam within said cup to open and close the knotter jaws, and a stationary knife arranged within said cord holder cup and operating in conjunction with said notched flange, all combined and arranged for operation substantially as shown and described. 30

2. In combination with the intermittently rotating cord holder having a crown shaped cup with cord holding notches formed in the flange of the cup, of the rotary knotter journaled in the said cord holder, and having its 35 looping jaws rotating within said cup and in a direction opposite to the rotation of said cord holder, said looping jaws of the knotter pointing in the direction of the discharge of the bound bundle while in the normal position, and making one complete revolution to 40 each tying operation, a guide and clamp to confine and hold the cord in the notches of the said flanged cup, and a stationary knife arranged within said cup and operating in 45 conjunction with said flange.

3. In combination with the rotary knotter having its looping jaws pointing in the direction of the discharge of the bound bundles 50 while in the normal position, of the intermittently rotating cord holder journaled about the knotter spindle and rotating in the direction opposite to the rotation of the knotter jaws, and having a crown shaped cup overhanging the knotter jaws, cord holding 55 notches formed in the flange of the cup surrounding the knotter jaws, a stationary guide to conduct the binding cord into the notch, a yielding cooperating guide and clamp to hold and confine the cord in the notch, a 60 knife arranged within said cup to sever the binding cord at the proper time, and a cam to open and close the knotter jaws at the proper time as described also arranged within 65 said cord holder cup.

4. The combination with the rotary knotter having its looping jaws at right angle or

nearly so to its spindle, and pointing in the direction of the discharge of the bound bundle while in the normal position, of the crown 70 shaped cord holder cup journaled about the knotter axis and rotating in the direction opposite to the rotation of the knotter jaws cord holding notches formed in the flange of said cup, a stationary guide to conduct the binding 75 cord into the notches, a yielding cooperating guide and clamp to confine and hold the cord in the notches, a stationary knife arranged within said cord holder cup and operating in conjunction with the notched 80 flange of said cup to sever the cord as the same is carried against said knife, and a stationary cam arranged within said cord holder cup to positively open and close the knotter jaws as the latter rotate. 85

5. The combination with the knotter frame, the main operating shaft and the knotter operating wheel mounted on the shaft, of the rotary knotter and intermittently rotating cord holder journaled in said frame in a common 90 bearing and rotating in a direction opposite to each other, a supplemental pinion also journaled in said frame and geared with the operating pinion of the cord holder, a pinion fast on the knotter spindle, and the 95 knotter operating wheel having a single beveled toothed segment on its face to engage and rotate positively both the knotter pinion and the supplemental pinion.

6. The combination with the knotter frame, 100 and the rotary knotter, of the intermittently rotating cord holder journaled in said frame, about the knotter spindle, and having a crown shaped cup overhanging the knotter jaws and rotating in a direction opposite to 105 the rotation of the knotter jaws, cord holding notches formed in the flange of said cup with their opened side projecting toward the binding receptacle or the grain in the receptacle, a stationary cord guide secured to the knotter 110 frame to guide the binding cord into said notches, a yielding cooperating guide and clamp movably secured to the said stationary guide plate to confine and hold the cord in the notches and against the outside periphery of the cord holder cup, a knife secured 115 to said guide plate, and bent over the notched flange and against the same on the inside of the cup to form a shear cutter in conjunction with the notched rotating flange 120 of the cord holder cup, and the stationary cam arranged within said cord holder cup to open and close the knotter jaws and secured to the stationary guide plate or frame.

7. In combination with the main frame, and 125 knotter operating wheel, of the rotary knotter and rotary cord holder journaled in said frame in the same bearing, a pinion fast on the knotter spindle engaged directly and rotated positively by the knotter operating 130 wheel, a pinion secured to the cord holder sleeve between the said knotter pinion and cord holder cup, a supplemental pinion journaled in said frame and adapted to gear with

said pinion on the cord holder sleeve, and engaged directly and rotated positively by the knotter operating wheel, substantially as shown and described for the purpose specified.

8. In combination with the rotary knotter, of the intermittently rotating cord holder cup journaled about the knotter spindle and having a rotation in the direction opposite to the rotation of the knotter, and having a crown shaped cup overhanging the knotter jaws, cord holding notches formed in the edge of the flange of said cup, a stationary cam plate partially surrounding said cord holder cup and overlapping the notched flange, a yielding clamping shoe having a concave surface fitting the outside periphery of the notched flange of the holder cup and arranged within said cam plate, a spring bearing against said shoe, and a screw secured into the cam plate and bearing on said spring, whereby the cord holding tension may be regulated a stationary cord guide formed on said cam plate extending around on the needle side of the cord holder cup to guide the binding cord into the notches of said cup, cams within said cup to positively open and close the knotter jaws as the latter rotate, and a knife within said cup to sever the applied band between the notched flange and the knotter jaws as the latter come to rest, as and for the purpose set forth.

9. In combination with the rotary knotter making one complete revolution to each tying operation, and having its looping jaws pointing in the direction of the discharge of the bound bundle while in the normal position with rigid cord rest at the base of the jaw, of the intermittently rotating cord holder cup journaled on the knotter spindle, and having the crown shaped cup overhanging the knotter jaws and said cord rest of the knotter, and the cord guide extending down at the needle side under said cup unto the cord rest to guide and conduct the cord unto the cord holder and said cord rest, said guide having a supporting plate extending around the knotter to the side opposite the guide, all substantially as shown and described.

10. In combination with the main frame and knotter operating wheel, of the rotary knotter and the intermittently rotating cord holder journaled in said frame in a common bearing and each having an independent movement, a pinion having a delay surface and fast on the knotter spindle, a supplemental pinion having a delay surface, and journaled independently in said main frame, and gearing with a corresponding pinion having twice as many cogs as said supplemental pinion and fast on the sleeve of the cord holder cup, and the single knotter operating wheel, having the single bevel toothed segment and a delay rim to engage both the knotter pinion and the supplemental pinion and rotate and lock both said pinions positively.

11. The combination of the rotary crown

shaped cord holder cup provided with cord holding notches on the flange forming the cup, and hooks on each side of the notch, and journaled about the knotter spindle, and overhanging the knotter jaws, and each notch adapted to alternately engage both ends of the applied band during the binding operation, and operating in conjunction with the yielding clamp and stationary knife to relieve the old end and simultaneously clamp and cut the new end.

12. The combination with the rotary knotter of the intermittently rotating cord holder, journaled on the knotter spindle, and having the crown shaped cup overhanging the knotter jaws, and rotating in the direction opposite to the rotation of the knotter jaws, and having cord holding notches formed in the edge of the flange of said cup with their opened side projecting toward the grain or binding receptacle, a stationary cord guide and a moving binding needle carrying and guiding the binding cord into said notches of the cord holder, a yielding cooperating guide and clamp to confine the cord into the notch and clamp it on the outside periphery of the cord holder cup, a knife arranged within said cup to sever the cord between the inside of the cup and the knotter jaws, and a stationary cam within said cup to open and close the knotter jaws at the proper time as the latter rotate.

13. The combination of the conical shaped cord holder cup journaled about the knotter spindle and overhanging the knotter jaws, and having the cord holding notches or hooks to engage the needle end of the binding cord and carry it under the clamping shoe between the periphery of the cup, and against the knife on the inside of the cup to sever the applied band from the needle end of the binding cord.

14. A rotary cord holder for grain binders having a conical shaped disk with its apex next the spindle side, and cord holding hooks upon the edge of the disk combined with a stationary guide and clamp to hold the cord upon the outside periphery of the disk.

15. In combination with the rotary knotter, rotary cord holder disk and their operating pinions, of the knotter operating wheel having upon its face but a single bevel segment and delay rim, adapted to engage said pinions and rotate both the knotter and holder disk, in the manner substantially as specified.

16. In combination with the rotary knotter and rotary cord holder disk, journaled in a common bearing, and their operating pinions, of a single actuating wheel having but a single segment and delay rim adapted to engage said pinions and rotate both the knotter and said disk in opposite directions, in the manner substantially as and for the purpose specified.

17. The combination of the rotary crown shaped cord holder disk, and rotary knotter with a rigid and pivoted jaw journaled in a

common bearing and their operating pinions, the stationary cam within the crown disk for controlling the pivoted looping jaw, and the single actuating wheel having but a single gear segment and delay rim adapted to engage said pinions and rotate both the knotter and disk in the manner substantially as specified.

18. In combination with the rotary knotter and rotary cord holder and their operating pinions having the delay shoes for locking

the pinions, of the single actuating wheel having but a single gear segment and delay rim adapted to engage said pinions and rotate the knotter and holder periodically as described and lock them in their normal position.

M. A. KELLER.

Witnesses:

JOHN R. KELLER,
IDA M. KELLER.