

(No Model.)

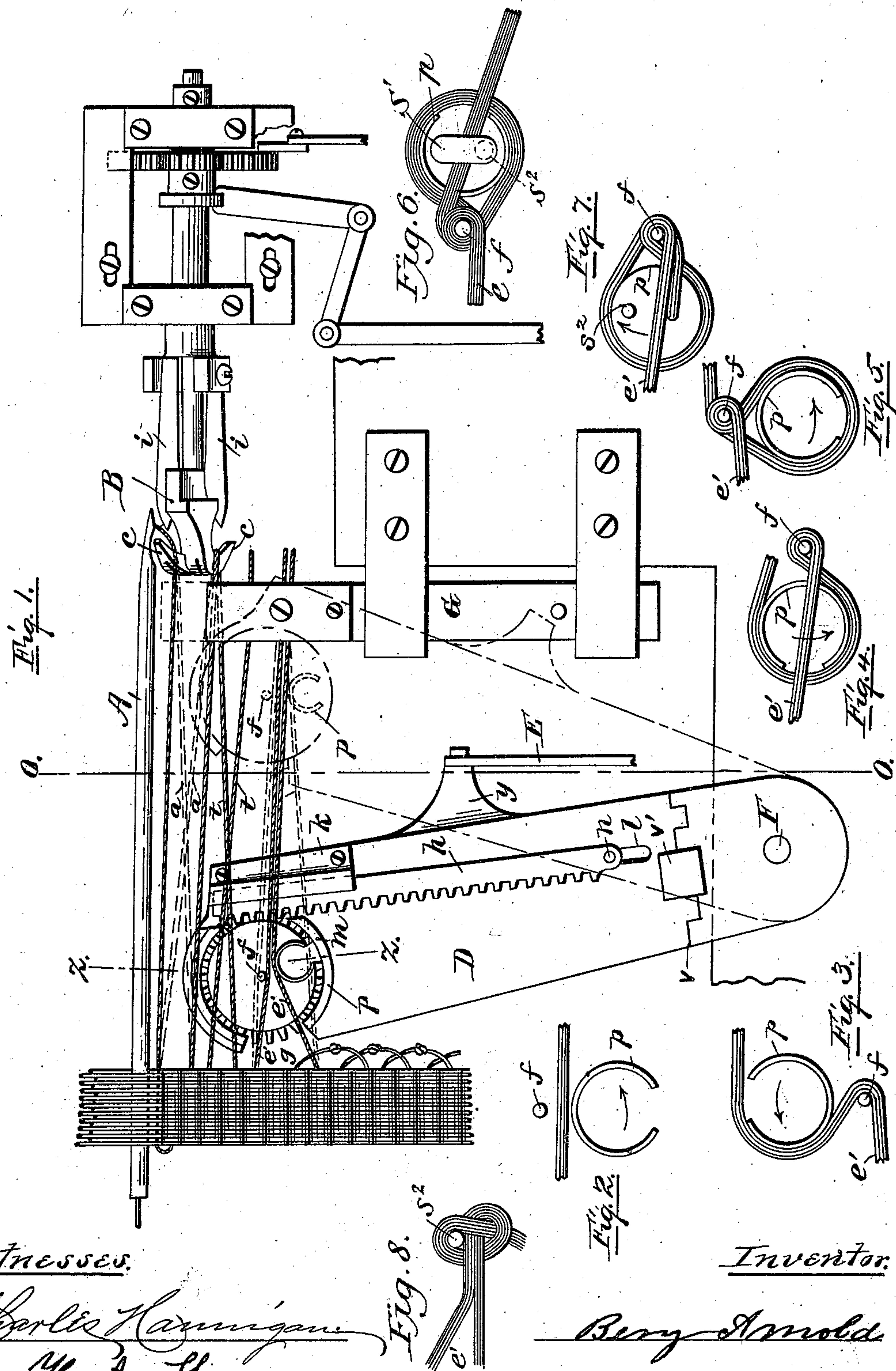
2 Sheets—Sheet 1.

B. ARNOLD.

MACHINE FOR MAKING AND KNOTTING FRINGES.

No. 504,316.

Patented Sept. 5, 1893.



Witnesses:

Charles Hammigan  
H. A. Shore

Inventor:

B. Arnold

(No Model.)

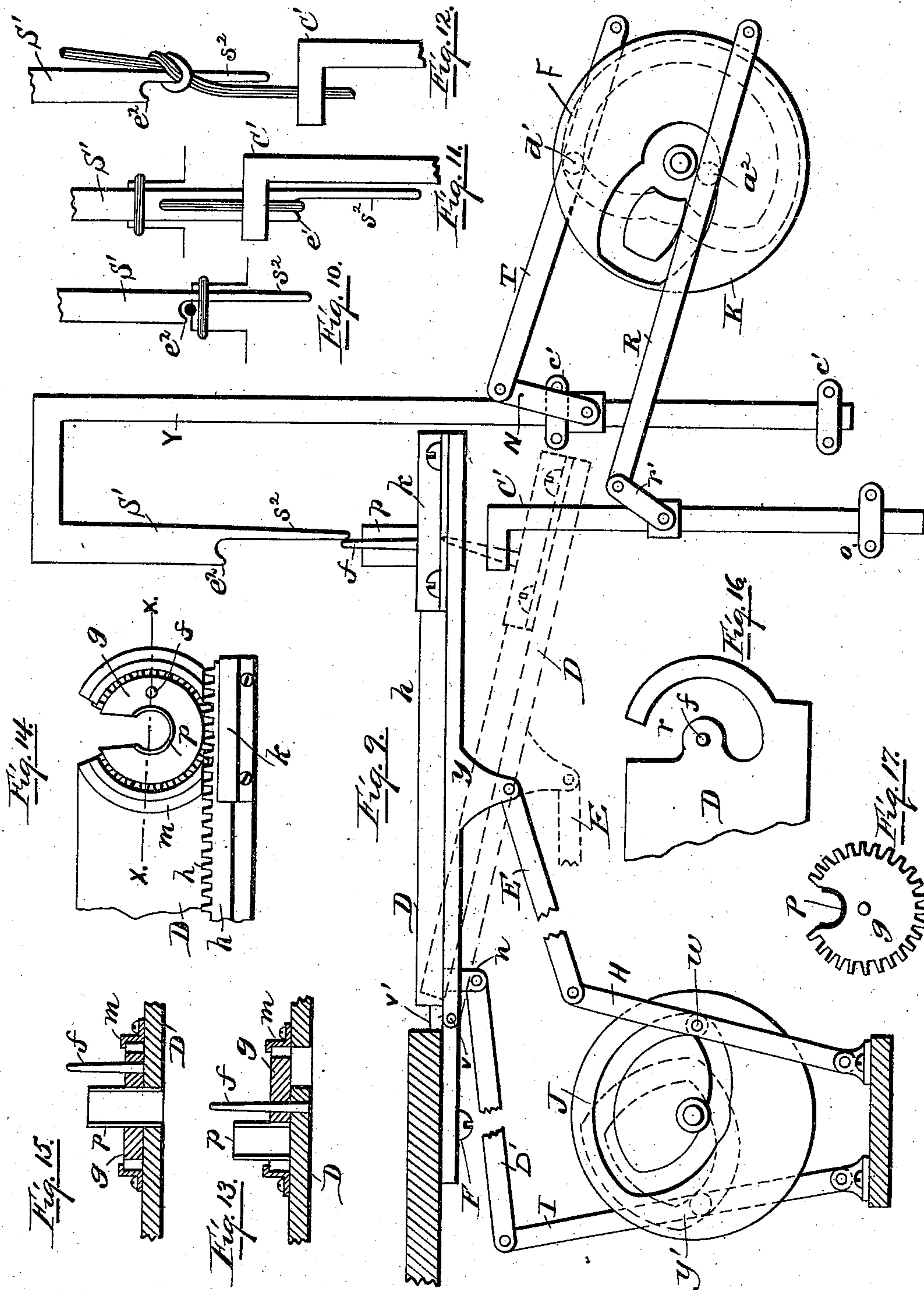
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# MACHINE FOR MAKING AND KNOTTING FRINGES.

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Witnesses.

Charles Harrigan  
Y. A. Shove

*Inventor.*

Berry Arnold



# UNITED STATES PATENT OFFICE.

BENJAMIN ARNOLD, OF EAST GREENWICH, RHODE ISLAND, ASSIGNOR  
TO THE MERIDEN CURTAIN FIXTURE COMPANY, OF MERIDEN, CON-  
NECTICUT.

## MACHINE FOR MAKING AND KNOTTING FRINGES.

SPECIFICATION forming part of Letters Patent No. 504,316, dated September 5, 1893.

Application filed December 22, 1892. Serial No. 456,020. (No model.)

*To all whom it may concern:*

Be it known that I, BENJAMIN ARNOLD, of East Greenwich, in the county of Kent and State of Rhode Island, have invented certain  
5 new and useful Improvements in Machines for Making and Knotting Fringes, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and  
10 to the letters of reference marked thereon, which form a part of this specification.

This invention relates to mechanism for knotting fringes and is an improvement on the invention disclosed in my application for  
15 Letters Patent of the United States, Serial No. 455,217, using the same combination of devices in assorting the threads to be tied together as therein set forth but substituting for the knot forming devices of that speci-  
20 fication another set of devices for that purpose, differently constructed and operated. It is fully illustrated in the accompanying drawings.

Figure 1. is a top view of the mechanism  
25 with threads of the fringe in position for tying. Figs. 2. to 8 show different progressive positions of the knot forming devices and threads on them while making the knot, enlarged. Fig. 9. shows an elevation of the  
30 looping mechanism taken to the left of line O, O, Fig. 1, also the cams and their connections that operate the devices. Figs. 10, 11, and 12 represent different positions of the winding looper and depressor with the draw-  
35 ing up jaws, in casting off the loop and closing up of the knot. Fig. 13, is a vertical section of the winding looper on line z, z, in Fig. 1. Fig. 14 shows a modified form of the wind-  
ing looper. Fig. 15 is a vertical section of the modification on line x x Fig. 14. Fig. 16  
40 shows the inner end of the looper plate. Fig. 17 shows a separate view of the gear-wheel.

This is a set of devices for forming and finishing the knot, adapted to be used with  
45 the combination of devices for assorting the threads to be tied, in proper position, shown in my application above referred to. For that reason enough of that mechanism is shown in Fig. 1 to enable any one to under-

stand the operation of the improvements. 50  
The parts taken from that application are constructed and operated in this combination as therein set forth.

In Fig. 1 the double hook B, has received two loops, one on each point c, at successive  
55 passes of the needle A. The loops are crossed by the turning of the double hook B, to the position of the dotted lines a, a, which are carried into and held by the presser G, by a forward  
60 movement of that device before the threads are cut on the hooks by the knives i, i. The threads are held in the presser by a slight friction in crossed position bringing every  
65 thread together with every third thread from it, in position for the knot winding device as described in my application referred to.

The knotting mechanism consists of a plate D, held on a pivot F, fast in the top plate of the machine at one end, so as to be free to  
70 swing the other end sidewise. This plate D is divided by a hinge v at a short distance from the pivot F, to allow the inner part of it to be moved up and down. A pin f, is in-  
75 serted in the center of the circle of the inner end of the plate, and a semi-circular opening r, is made around the pin, opening out to the left side of the plate opposite to the pin f, see  
80 Fig. 16. A gear wheel g, is held on the pin f, and a rack h, is held at the right side of the gear, the teeth of the two engaging with each other. The rack h, is held free to slide, in a plate  
85 k, fast on plate D. A slot l, is made through the plate D, over which the rack lies, and a stud n, fast in the rack extends down through the slot l, to the under side of the plate D, to serve as a guide to that end of the rack and  
90 also to connect it with the cam lever that moves it. A protecting casing m, is placed over the teeth of the gear g, except where the opening out to the left occurs, and except over  
95 the rack. A short tube p, is made fast in the gear near its edge and an opening is made through the gear agreeing with the opening through the tube, and an opening is cut in both tube and gear out through their peripheries, see Fig. 17. An arm y, is attached to one side  
of the plate D, by which the plate is moved up and down and sidewise by the rod E, con-



nected by a pin to the arm, and attached at the other end to the cam lever H, which has a friction roll  $w$ , that runs in a groove in the cam J.

Starting with the plate D, in position of the dotted lines in Fig. 1, the first motion inward given to the cam lever E, by the groove in the cam will throw the plate D, to a horizontal position where it will be stopped by the check  $v'$ , which brings the pin  $f$ , on one side of the threads  $e'$  and tube  $p$ , on the other side. A continuation of the motion of the cam lever H, swings the plate D, over to the position shown by the full lines in Fig. 1 with the threads  $e'$  between the pin and tube. At this point the rack  $h$ , is moved inward by the cam lever I, which has a friction roll  $y'$ , that runs in a groove in the other side of the cam J, shown by the dotted lines.

The cam lever I, is connected by the rod D', to the rack  $h$ , the motion of which turns the gear  $g$ , and winds the threads  $e'$ , around the tube  $p$ , and pin  $f$ , as follows: The parts are shown enlarged. Fig. 2 shows the position before the rack  $h$ , moves. Fig. 3 shows the position after one half turn of the gear  $g$ . In Fig. 4 the gear has made three fourths of a turn with the thread to the left passing over the end of the tube  $p$ . Fig. 5 shows a full revolution of the gear to the first position. Fig. 6 shows a quarter turn more with the thread to the right in Fig. 5 over the end of the tube, with a section of the depressor S' over the thread as in Fig. 10. Fig. 7 shows a half turn back of the gear  $g$ , the depressor having pushed the thread down through the tube into the jaws C', as in Fig. 11, and moved up again so as to leave only its pin  $s^2$ , in the tube  $p$ . At this point the plate D, has a downward motion given to it by a reverse motion of its cam lever, that draws the tube  $p$ , and pin  $f$ , out of the threads and leaves them to be drawn up around the pin  $s^2$ , by the jaws C' sufficiently tight for that pin to be drawn entirely out of the knot and leave it to be drawn up tight by a still further motion downward of the jaws. The plate D, and devices on it are then moved back to the position shown by the dotted lines in Fig. 1 by a reverse motion of the cam lever H, and the cam lever I, also moves the rack  $h$ , back and turns the gear wheel  $g$ , and its pin  $f$ , in proper position to have another set of threads brought over it by the presser G.

In the modification of the loop winder shown in Figs. 14 and 15 the tube  $p$ , is made fast in the plate D, in the center, instead of the pin  $f$ , and the gear wheel  $g$ , is held to turn on it, with the pin  $f$ , made fast in the wheel near its periphery—that is, the positions of the tube and pins are reversed. In this plan the gear in turning winds the threads by the pin around the tube and the pin very much in the same way as when the tube was carried around the pin as before described. The

jaws that draw down the loop are held in a clamp  $o$  and connected by the bar  $r'$ , to the end of the cam lever R, which has a friction roll  $a^2$ , running in a groove in the cam K.

The depressor S' consists of a flat bar having the lower end cut away to form a shoulder  $e^2$ , and the part below the shoulder is drawn down to form a pin  $s^2$ ; slightly tapering down from the shoulder to the point. This bar S', is held at its upper end by a joint to an arm extending from an upright rod Y, that slides in brackets  $c' c'$ , attached to the stationary part of the machine. The rod Y, is connected by the bar N, to the cam lever T, which has a friction roll  $d'$ , running in a groove on the other side of cam K, shown in dotted lines F. The knot made by these devices is the simple "over hand" knot usually made in such work.

As before stated the mechanism herein shown and described is for the purpose of tying the knots and may be used in combination with different sets of devices for arranging the threads to be tied and holding them in position for the knotting mechanism to operate upon.

One of the most important points in work of this character is to obtain as exact uniformity or regularity of the knots as possible. This is attained in this combination of the tube and depressor in keeping a steady tension on the threads while the knot is being formed and drawn out, thereby preventing them from becoming unevenly arranged either in their order or shape by reason of being loose in whole or in part.

Having thus described the construction and operation of my improvement, I claim as my invention—

1. In a machine for knotting fringes the combination of a tube and pin arranged to revolve, one around the other and wind the threads in a knot forming loop, with a depressor placed above the tube and having a shoulder to push the threads through the tube to form a knot and a pin at its end for the knot to draw up on, with means for revolving said tube and pin, substantially as specified.

2. In a fringe knotting machine the combination with a thread assorting mechanism, of a plate pivoted to swing horizontally and provided with a hinge in it to allow of a vertical motion at its free end, a gear wheel held to turn on a pin fastened in the plate near its free end, and having a tube inserted in it near its periphery, with a toothed rack held on said plate and arranged to engage with the gear and turn it, with means for moving the plate horizontally and vertically, and means to move the rack, substantially as set forth.

BENJ. ARNOLD.

Witnesses:

E. B. READ,  
JAMES E. ARNOLD.