

3 Sheets—Sheet 1.

Patented June 21, 1892.

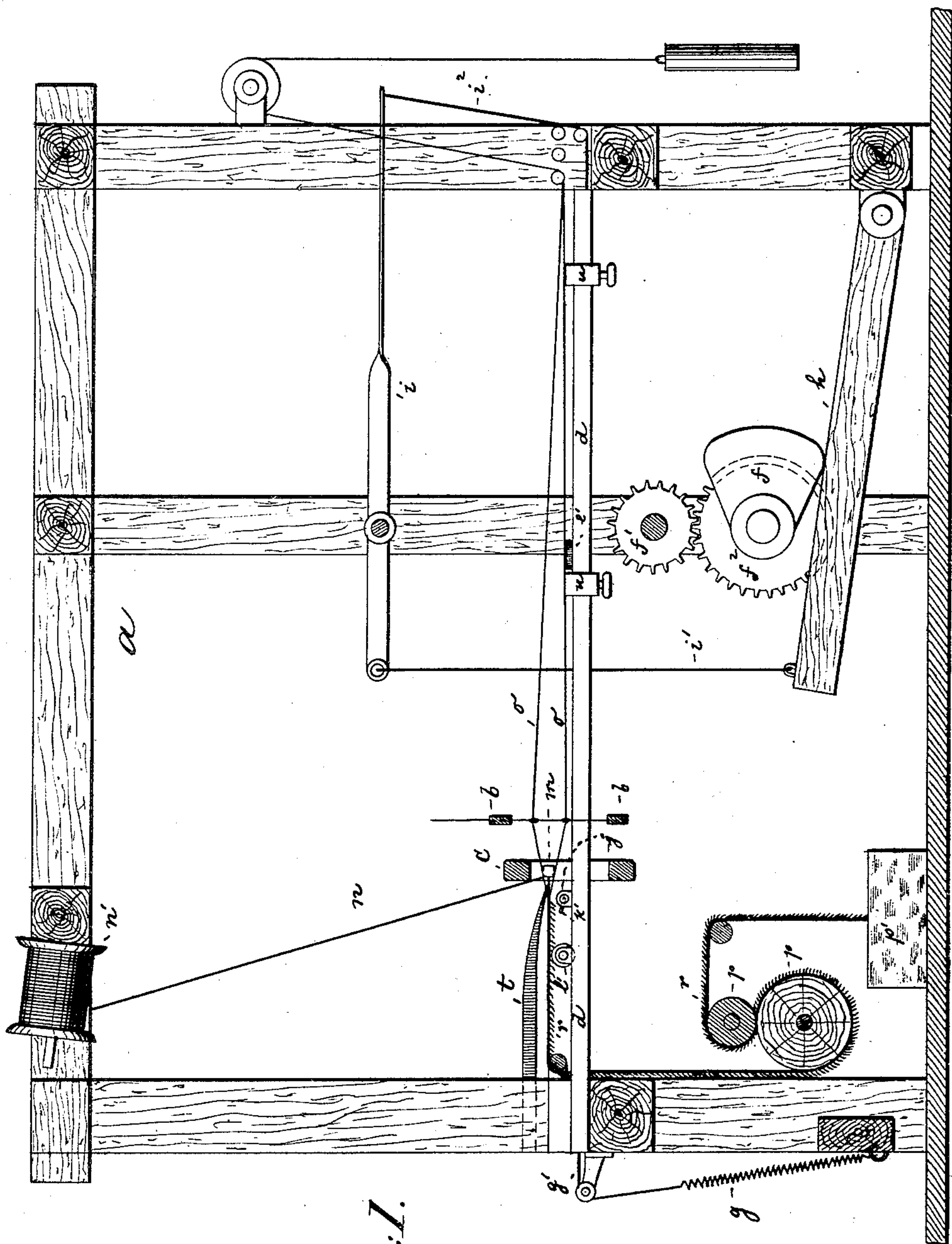


Fig. 1.

A. Schöhl.  
Wm. Schulz.

K. Engsberg

BY *Goeder & Briesen*

ATTORNEYS

(No Model.)

3 Sheets—Sheet 2.

K. ENGSBERG.  
LOOM FOR WEAVING FRINGE.

No. 477,204.

Patented June 21, 1892.

Fig. 1.

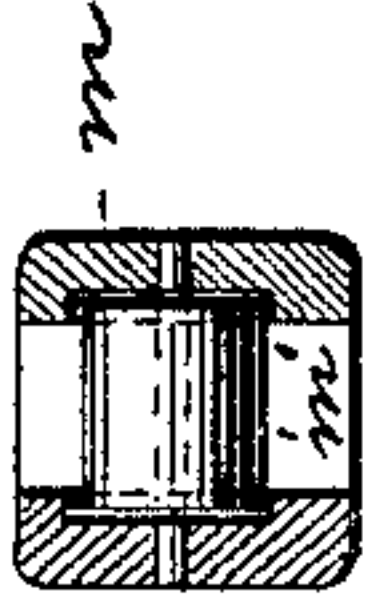


Fig. 6.

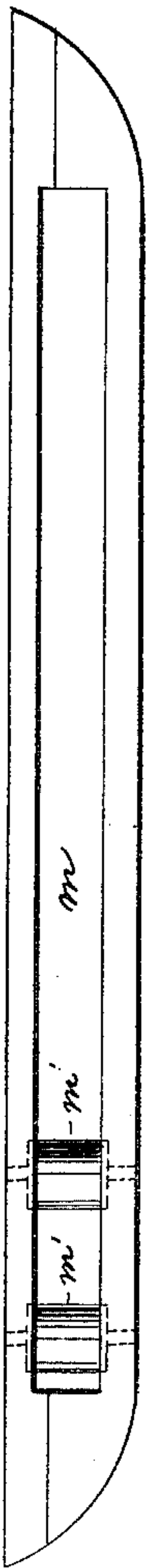


Fig. 2.

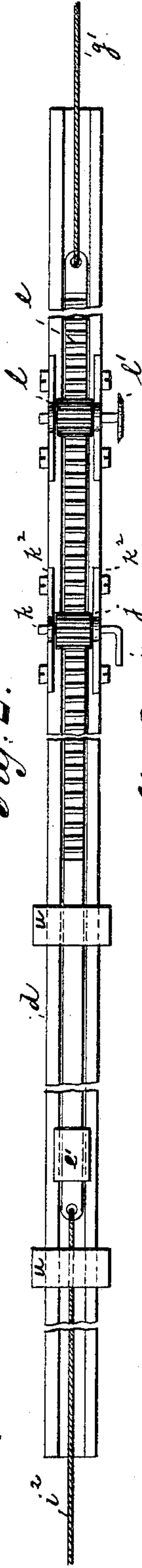


Fig. 3.

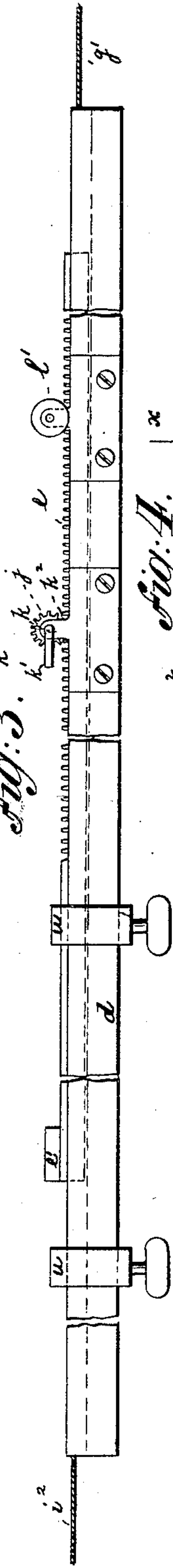


Fig. 4.

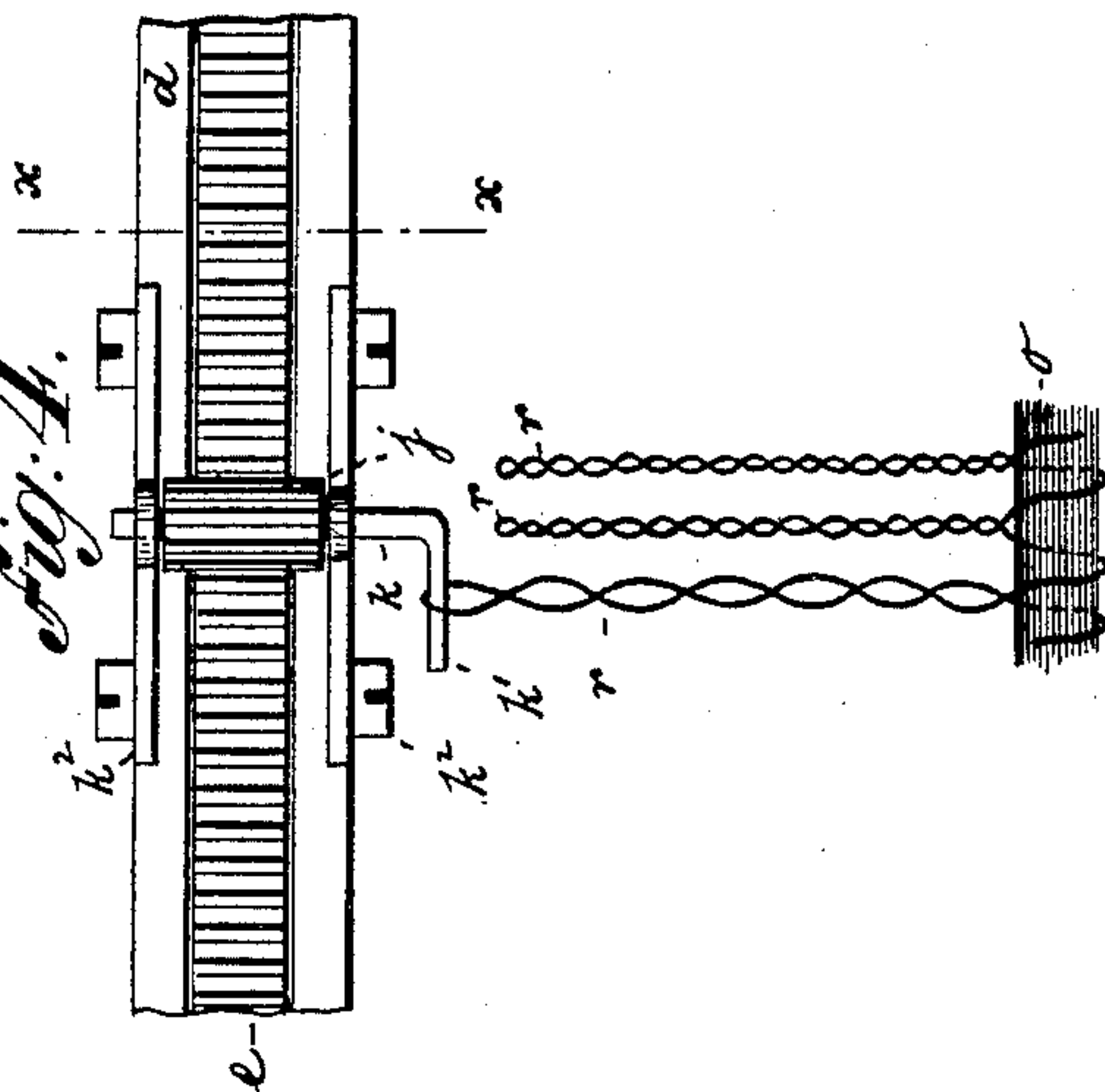
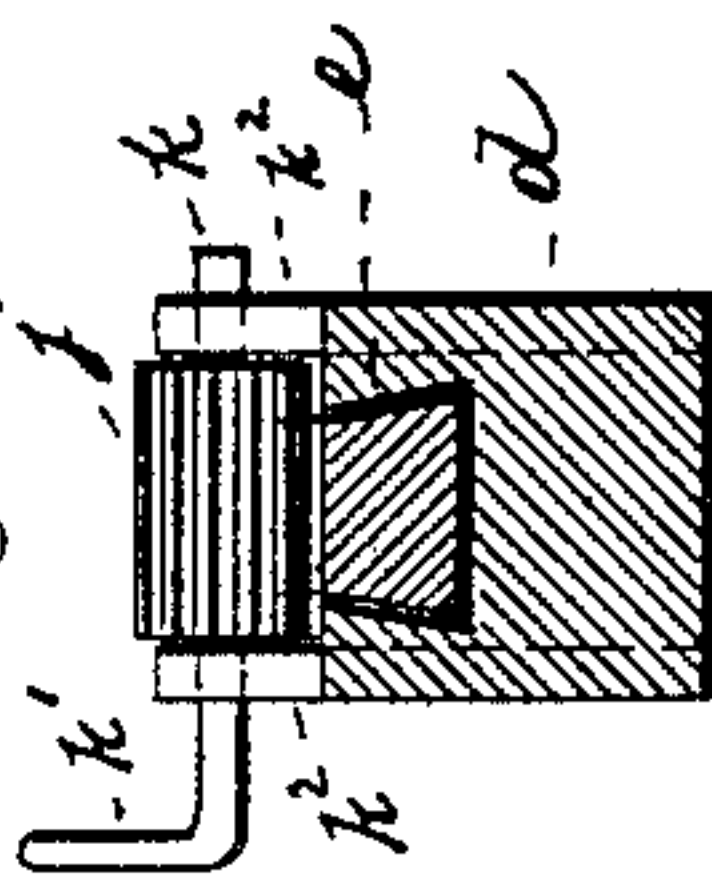


Fig. 5.



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INVENTOR  
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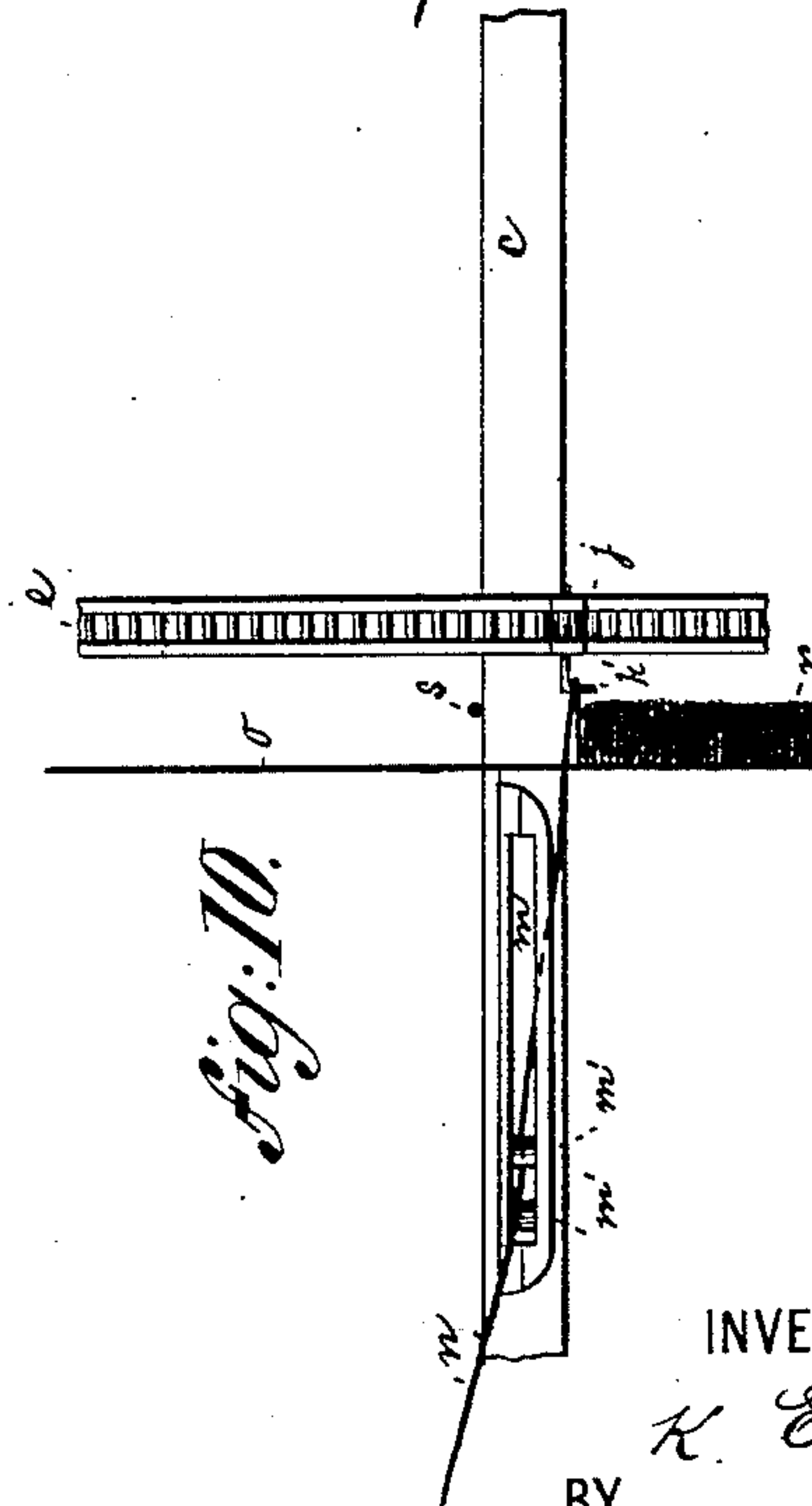
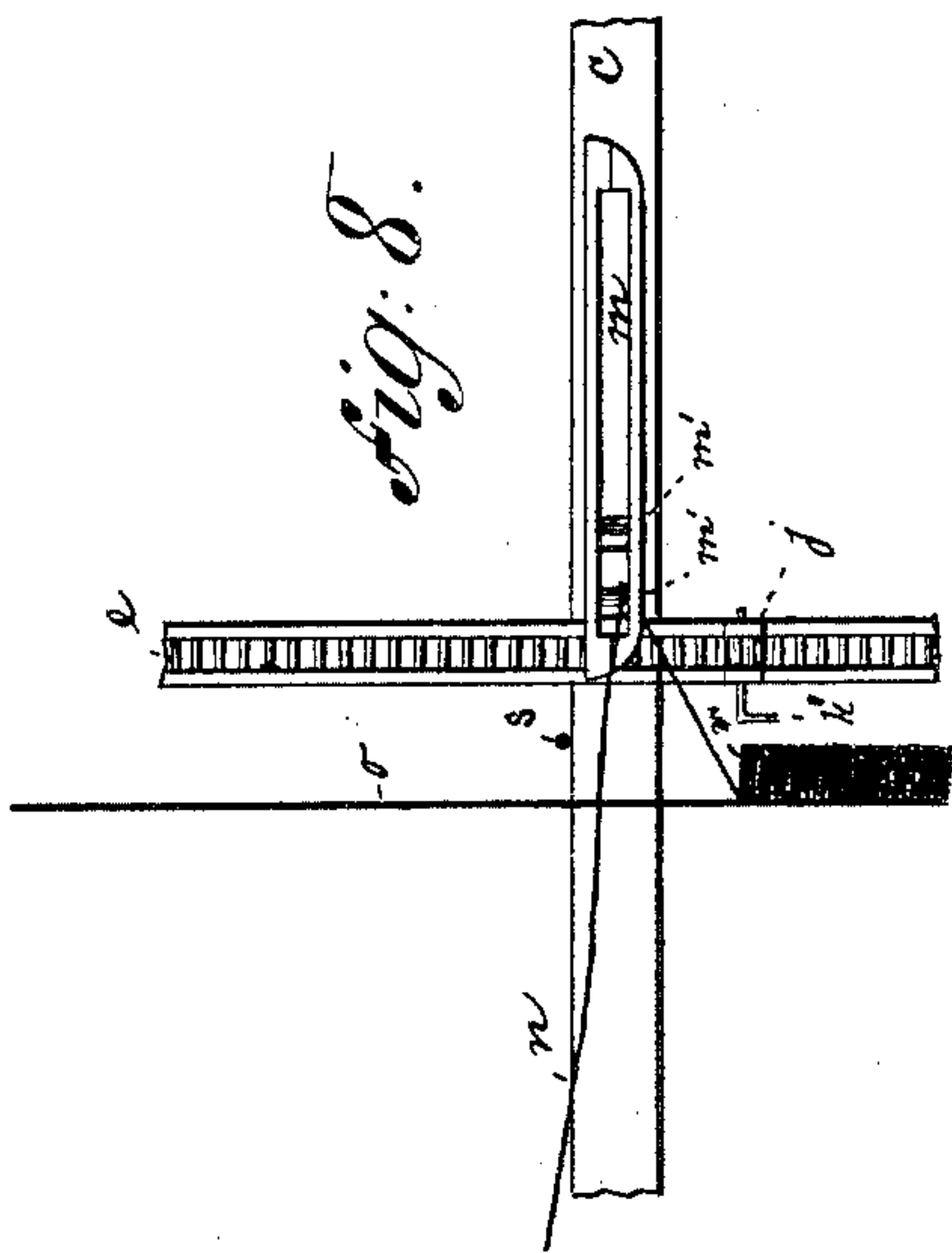
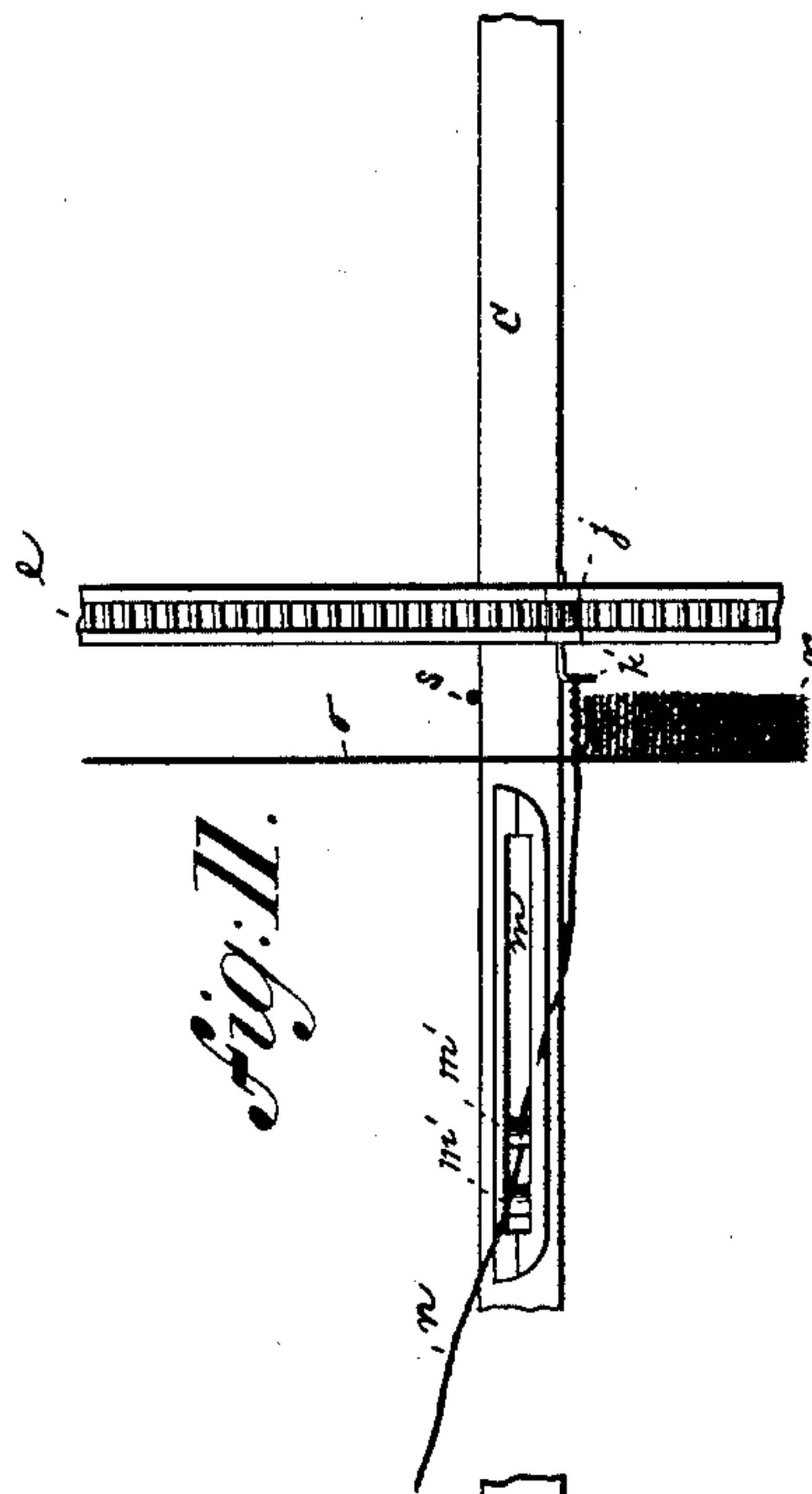
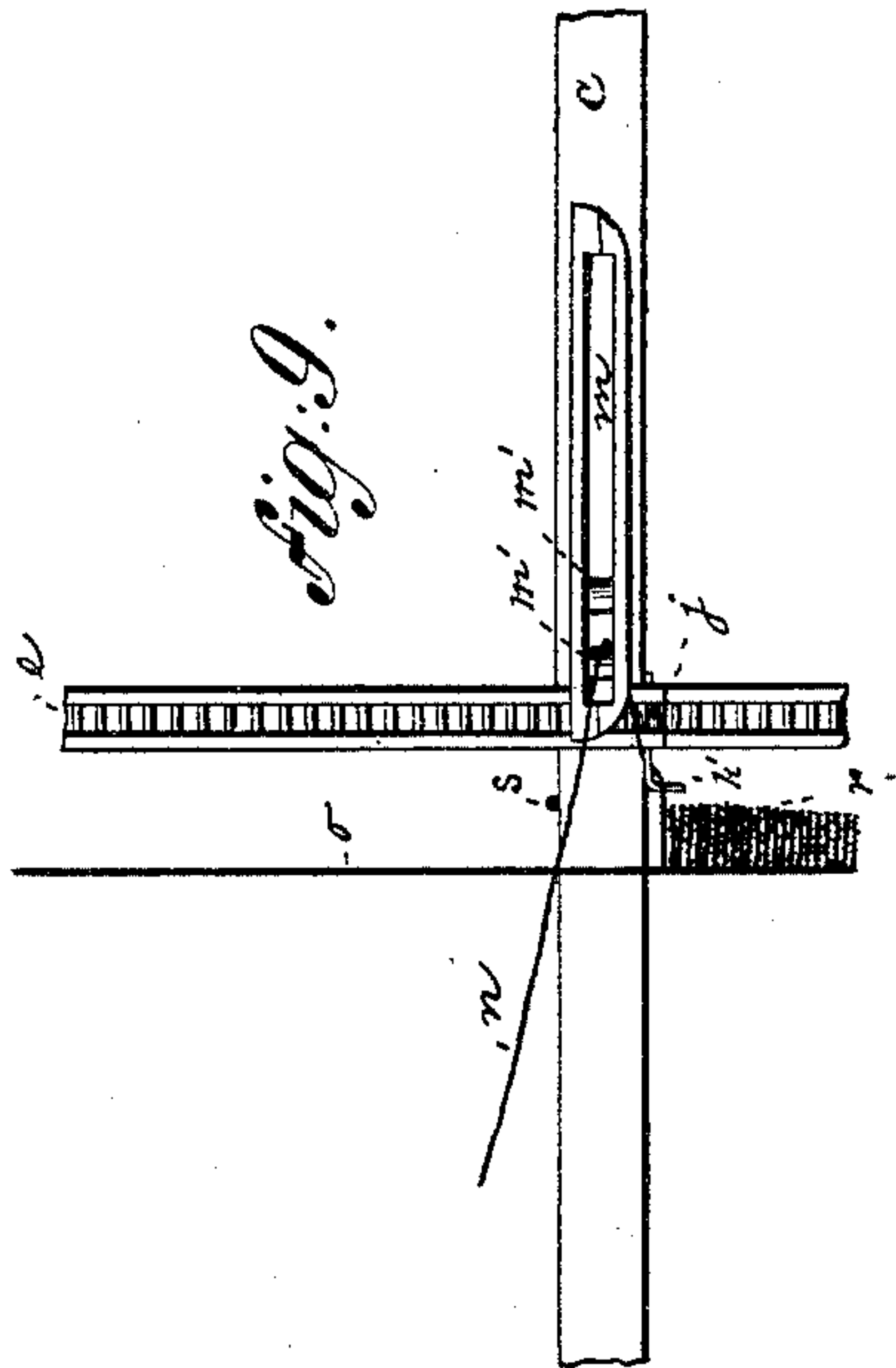
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3 Sheets—Sheet 3.

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LOOM FOR WEAVING FRINGE.

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WITNESSES:

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*Am. Schulz.*

INVENTOR

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# UNITED STATES PATENT OFFICE.

KARL ENGSBERG, OF NEW YORK, N. Y.

## LOOM FOR WEAVING FRINGE.

SPECIFICATION forming part of Letters Patent No. 477,204, dated June 21, 1892.

Application filed August 15, 1891. Serial No. 403,705. (No model.) Patented in England January 14, 1886, No. 618.

*To all whom it may concern:*

Be it known that I, KARL ENGSBERG, of New York city, New York, have invented an Improvement in Looms for Weaving Fringe, (for which I have obtained a patent in England, No. 618, dated January 14, 1886,) of which the following is a specification.

This invention relates to an attachment to looms, by which loops formed by the shuttle-thread are automatically twisted into fringes.

The invention consists in the various features of improvement more fully pointed out in the claims.

In the accompanying drawings, Figure 1 is a cross-section through a loom provided with my improved fringe attachment. Fig. 2 is a top view of the twister proper; Fig. 3, a side view thereof; Fig. 4, a detail top view of the main part of the twister; Fig. 5, a cross-section on line  $x x$ , Fig. 4; Fig. 6, a side view of the shuttle; Fig. 7, a cross-section thereof. Figs. 8, 9, 10, and 11 show consecutive stages of the shuttle-thread during the formation of a fringe.

The letter  $a$  represents a loom of suitable construction for weaving fringe.

$b$  is the harness, and  $c$  the lay.

The loom is provided with one or more grooved rails  $d$ , extending from the front to the rear, and in which there is free to move backward and forward a rack or toothed bar  $e$ . This toothed bar is drawn backward and forward at regular intervals (*i. e.*, at the formation of each fringe) by means of a cam  $f$  and a counteracting spring  $g$ . The spring is connected to the forward end of the rack by string  $g'$ . The cam  $f$  is driven from the work-shaft by suitable gearing  $f' f^2$  and acts against a lever  $h$ . The free end of this lever is by string  $i'$  connected to one end of a lever  $i$ , the other end of which is by string  $i^2$  connected to the rear end of rack  $e$ . Thus a revolution of the cam will cause the rack to be reciprocated, as will be readily understood. The rack  $e$  engages and revolves a pinion  $j$ , fast on a shaft  $k$ , having a hook-shaped end  $k'$  and turning in bearings  $k^2$  of rail  $d$ . This pinion is placed somewhat in front of the lay, as shown in Fig. 1.

In front of the pinion  $j$  there may be arranged a second pinion  $l$ , also driven by the rack and provided with a suitable cutting-

disk  $l'$ . This pinion  $l$  is only to be used if fringes are produced that are to have cut or open ends.

$m$  is the shuttle, which I prefer to make of the construction shown in Fig. 6—that is to say, it is provided with a pair of pins or rollers  $m'$ , between which the weft  $n$  passes. This weft is gradually unwound from a spool  $n'$ , secured to the loom, in contradistinction to a spool carried by the shuttle itself. Thus the spool need not be thrown through the shed formed by the warp-threads  $o$ ; but each reciprocating motion of the shuttle will cause a sufficient length of thread to be unwound from the spool to form one loop or fringe.

The operation of the machine is as follows: The shuttle first moves to the right and traverses the warp, beyond which it moves to form a loop, Fig. 8. Then the lay, with the shuttle, moves forward and backward to cause the loop to be enlarged by a finger  $t$  and to be engaged by the hook  $k'$ , Fig. 9. The shuttle next moves to the left, recrossing the warp, while the loop is retained by the hook, Fig. 10. At this point the cam  $f$  causes the rack  $e$  to be moved backward, and thus the pinion  $j$  is revolved to twist the loop into a twisted fringe  $r$ , Fig. 4. Then the shuttle and lay move forward until a stop-pin  $s$ , secured to the lay, knocks the finished fringe off the hook, after which the spring  $g$  causes the rack to be moved forward and into its original position, ready for the formation of the next fringe.

Fig. 11 shows the position of the parts immediately before the pin  $s$  knocks the fringe off the hook. The work passes around rollers  $p$  and is received by a suitable box  $p'$ .

To regulate the length of motion or stroke of the rack  $e$ , it is provided at one end with a head  $e'$ , moving between a pair of adjustable gages or stops  $u$ .

In ornamental or mixed fringes, in which twisted fringes alternate with plain fringes, the cams are so proportioned that the rack is reciprocated at the intervals at which the fringes are to be twisted.

What I claim is—

1. The combination, in a fringe-twister, of a shuttle with a reciprocating rack, a pinion engaged thereby, and a hook secured to the pinion and adapted to engage the looped weft, substantially as specified.

2. The combination of a shuttle with a reciprocating rack, a pinion engaged thereby, a hook secured to the pinion, and a stop *s* for throwing off the loop, substantially as specified.  
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3. The combination of a reciprocating rack with a pinion engaged thereby, a hook secured to the pinion, a shuttle having pins *m'*, and with a fixed spool *n'*, substantially as specified.

10 4. The combination of a reciprocating rack *e*, having head *e'*, with a pinion, a hook secured

to the pinion, and with a pair of gages *u*, engaging the head *e'*, substantially as specified.

5. The combination of a reciprocating rack with a pair of pinions engaged thereby, a hook *k'*, secured to one pinion, and a cutter *l'*, secured to the other pinion, substantially as specified.  
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KARL ENGSBERG.

Witnesses:

F. v. BRIESEN,

W. R. SCHULZ.