

**No. 679,417.**

**Patented July 30, 1901.**

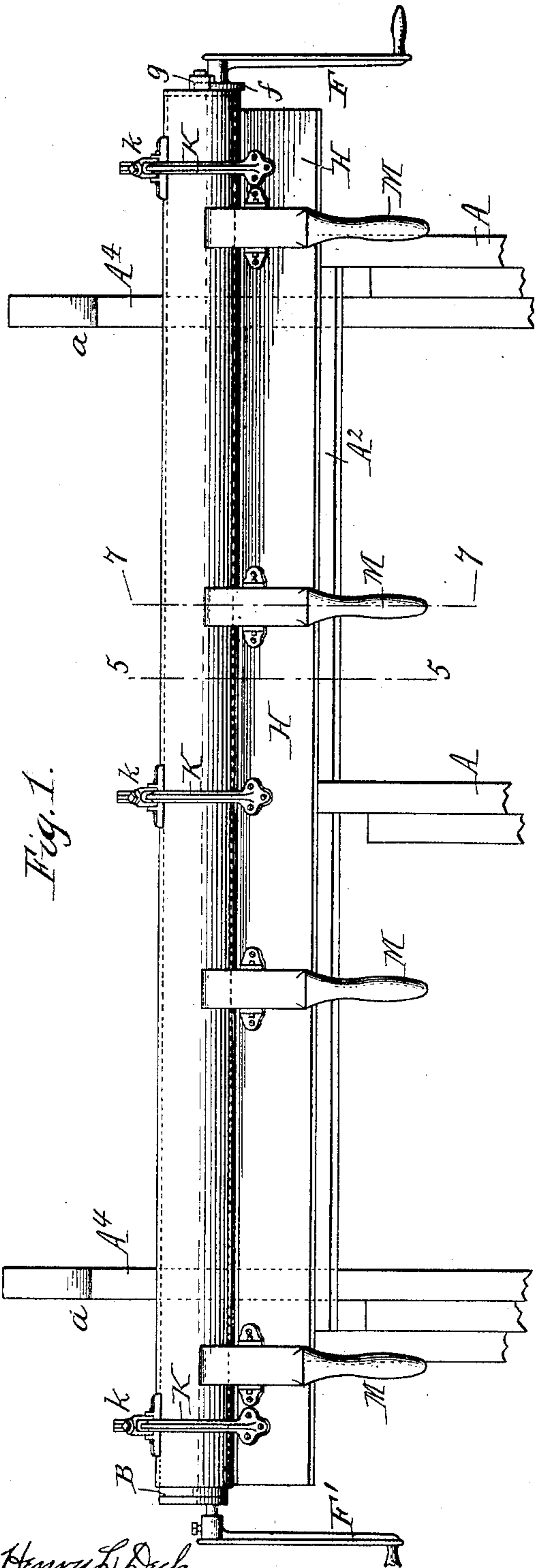
**J. H. CROCKER.**

## MACHINE FOR BENDING GUTTERS.

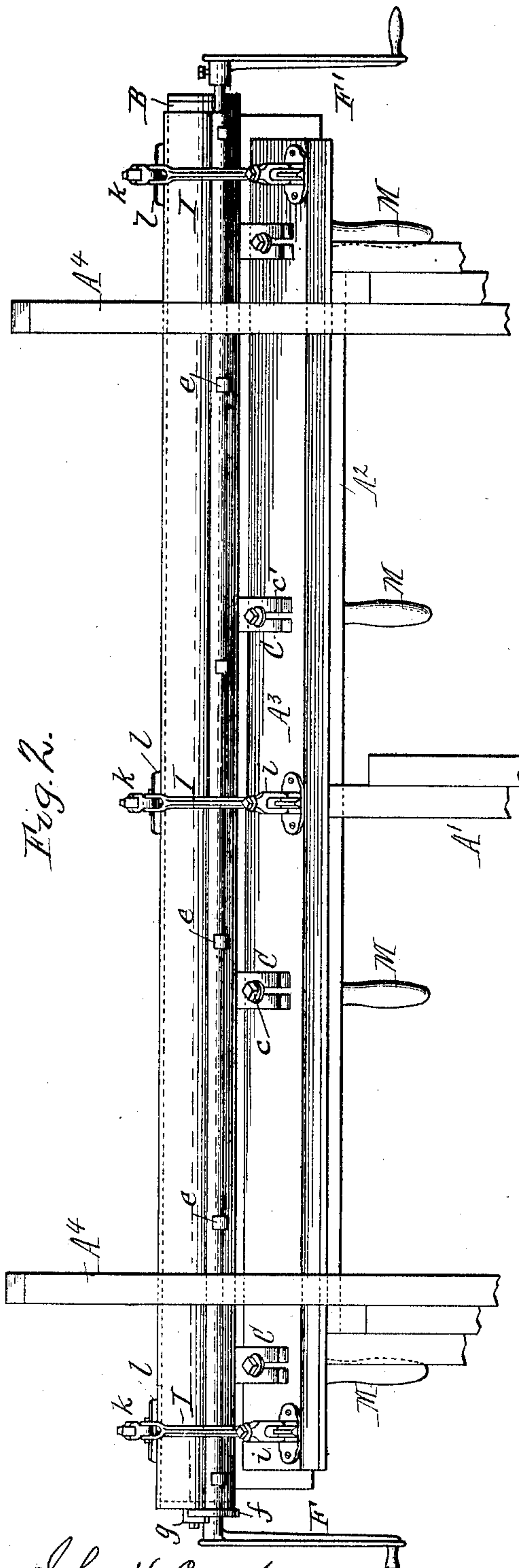
(Application filed Apr. 8, 1901.)

(No Model.)

**2 Sheets—Sheet 1.**



Henry L. Deck.  
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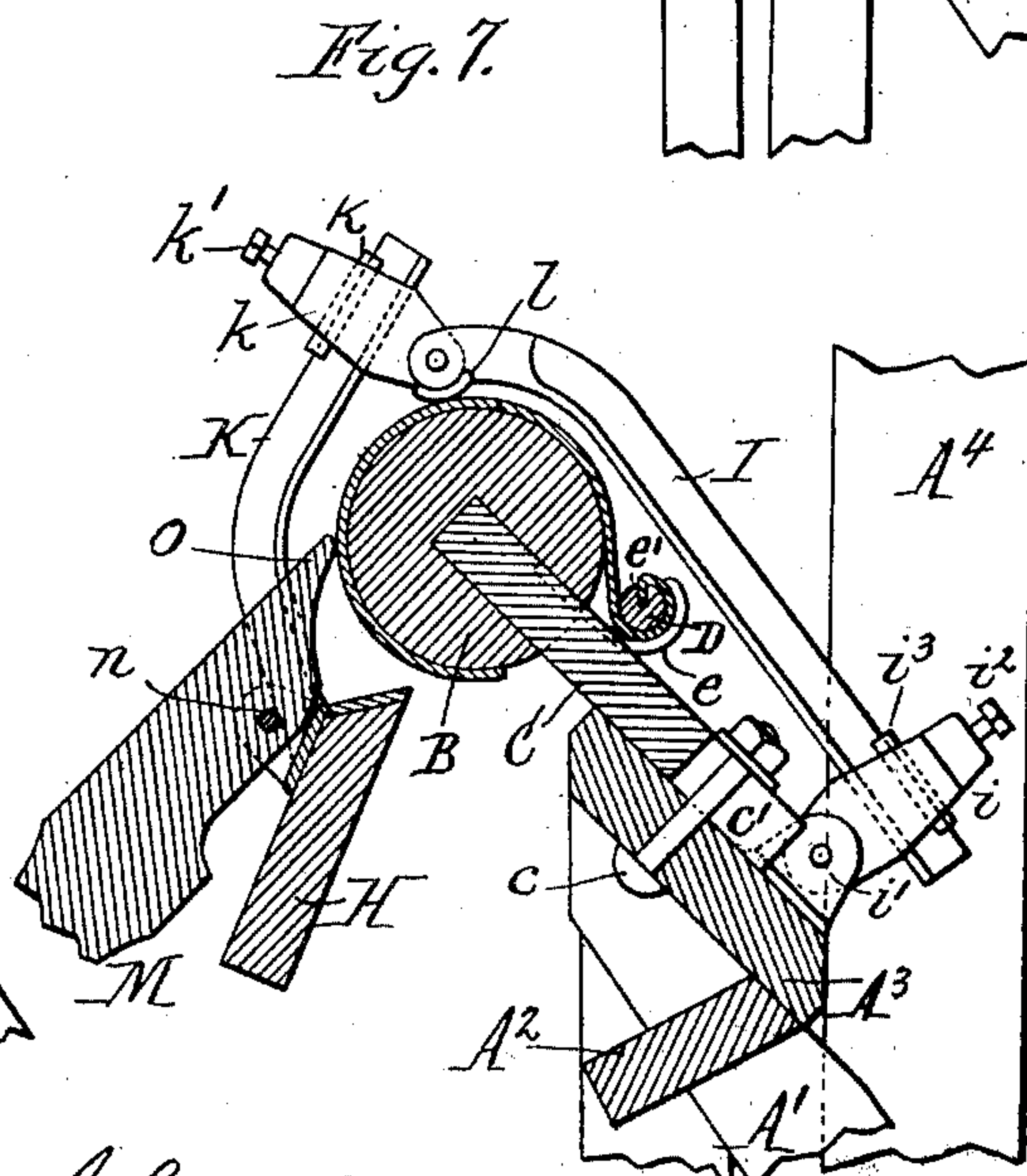
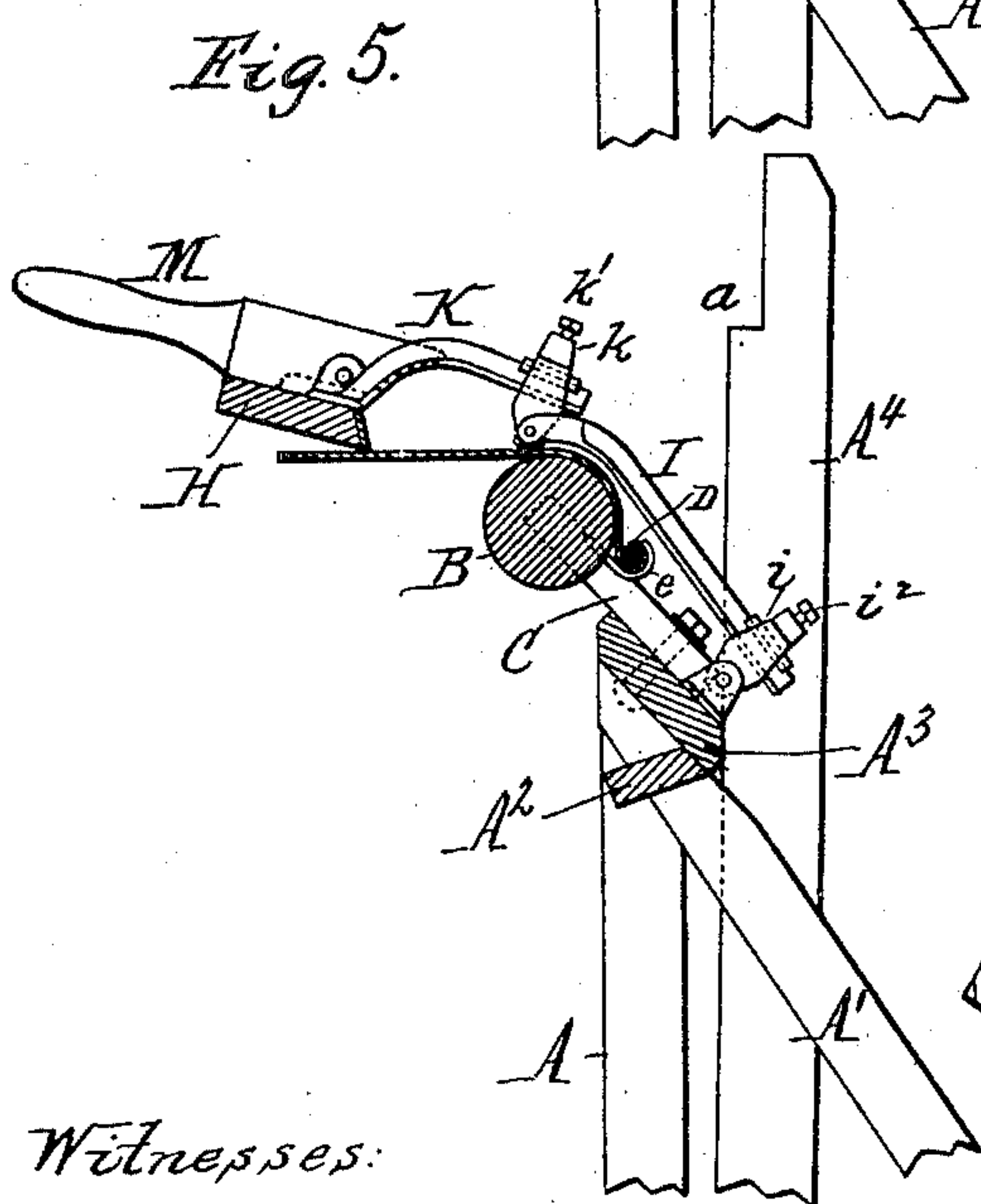
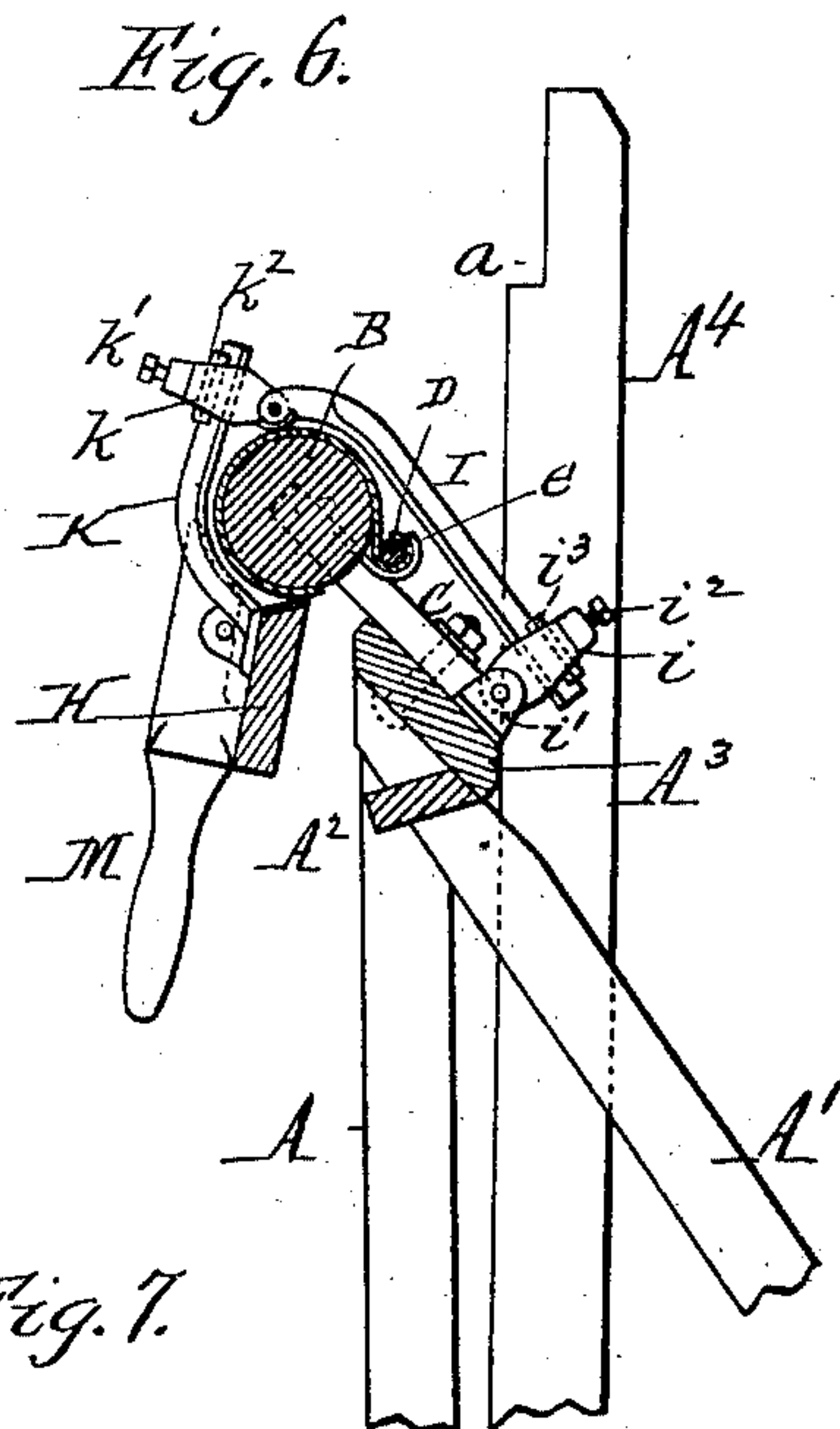
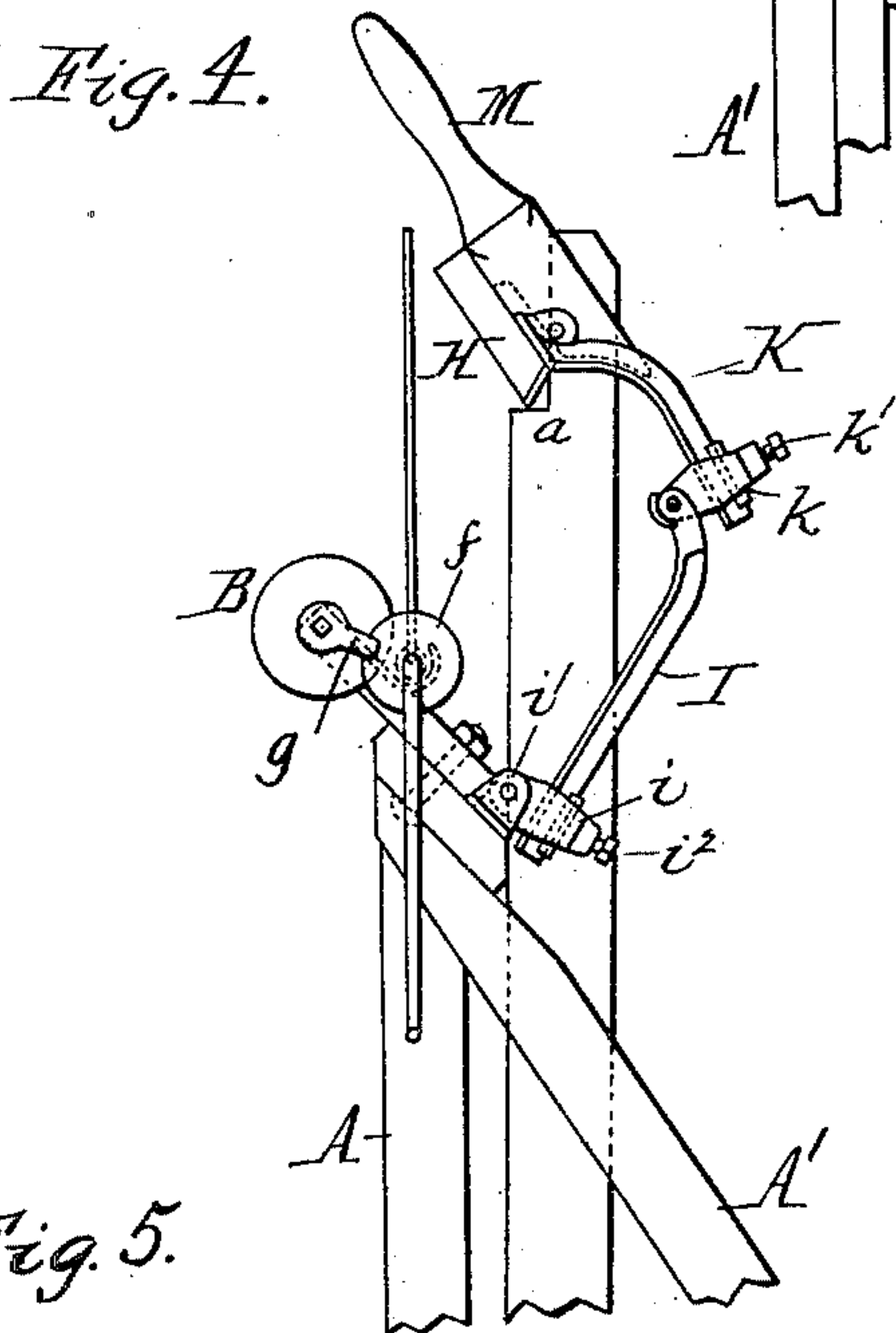
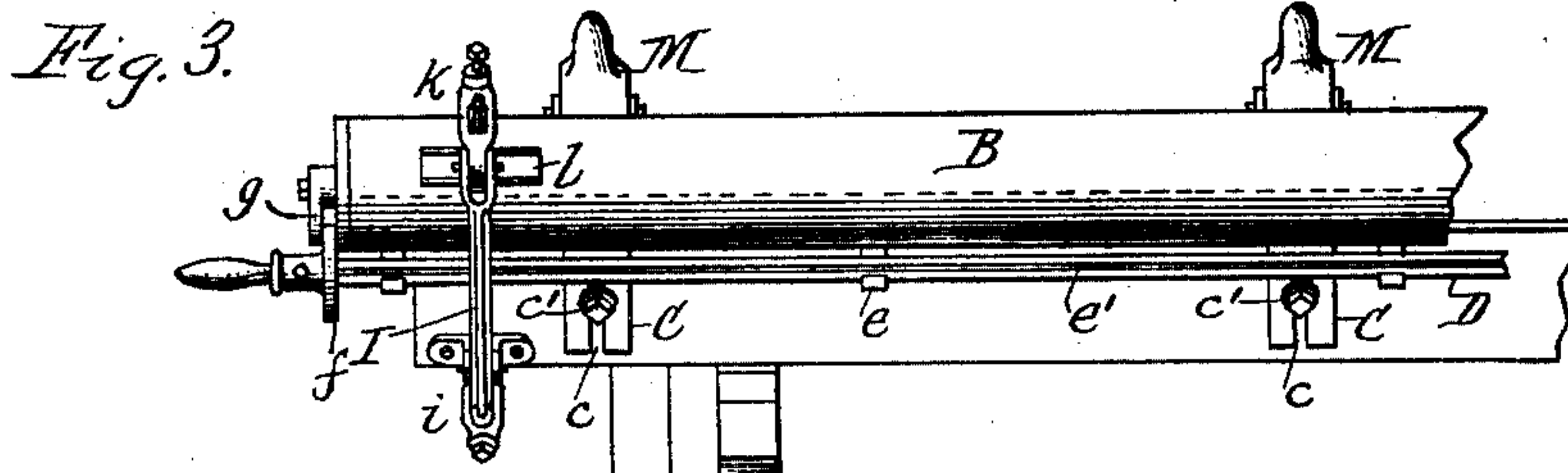
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MACHINE FOR BENDING GUTTERS.

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2 Sheets—Sheet 2.



Witnesses:

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# UNITED STATES PATENT OFFICE.

JOHN H. CROCKER, OF BUFFALO, NEW YORK.

## MACHINE FOR BENDING GUTTERS.

SPECIFICATION forming part of Letters Patent No. 679,417, dated July 30, 1901.

Application filed April 8, 1901. Serial No. 54,925. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. CROCKER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Machines for Bending Gutters, of which the following is a specification.

This invention relates to that class of machines for bending sheet-metal gutters or troughs which embody a stationary cylindrical mandrel arranged horizontally and a forcing or forming bar which is swung forwardly over the mandrel and which bends the flat sheet-metal blank around the mandrel. In the use of such a machine the blank of sheet metal is secured at one of its longitudinal edges adjacent to the mandrel, on the rear side thereof, by inserting the blank in a slotted rod which is turned for forming a bead or curl along one edge of the blank. The forcing-bar is then swung, so as to bend the blank around the upper side of the mandrel.

One of the objects of my invention is to provide means for acting upon the blank between the forcing-bar and the fastened edge of the sheet, whereby the sheet is more easily bent and caused to lie more closely against the mandrel.

Other objects of my invention are to provide ready means for adjusting the mandrel, the forcing-bar, and the pivoted supporting-arms of the latter, so that the machine can be readily arranged for forming gutters of different radii and of different widths and to render the beading-rod readily reversible.

In the accompanying drawings, consisting of two sheets, Figure 1 is a front elevation of a gutter-bending machine embodying my improvements, the figure showing the parts in the position in which the bending of the gutter has been completed. Fig. 2 is a rear elevation of the machine, showing the parts in the same position. Fig. 3 is a fragmentary top plan view of the machine with the gutter omitted. Fig. 4 is an end elevation of the machine, showing the forcing-bar supported on the standards of the stationary frame preparatory to beginning the bending operation. Fig. 5 is a vertical cross-section in line 5 5, Fig. 1, showing the gutter partly bent. Fig. 6 is a similar view showing the bending of the gutter completed. Fig. 7 is a vertical

cross-section, on an enlarged scale, in line 7 7, Fig. 1, showing the bending of the gutter completed and the forcing-bar swung away from the gutter by the hand-levers.

Like letters of reference refer to like parts in the several figures.

The stationary frame of the machine consists of upright front legs A, inclined rear legs A', a connecting top piece A<sup>2</sup>, a table A<sup>3</sup>, secured to the legs above this top piece in a rearwardly-sloping position, preferably at an angle of about forty-five degrees, and standards A<sup>4</sup>, which extend above the table on the rear side thereof. These standards are provided on their front sides at a suitable height above the table with shoulders *a* for supporting the forcing-bar in an elevated position.

B is the cylindrical mandrel, around which the sheet metal is bent and which is arranged in a horizontal position above the table. This mandrel is supported on the table by arms C, which extend downwardly and rearwardly from the mandrel and rest upon the inclined upper surface of the table, to which they are secured by bolts *c*, passing through longitudinal slots *c'* in the arms. Upon loosening these bolts the mandrel can be adjusted up or down or can be removed and replaced by a mandrel of different diameter.

D is the beading-rod, which is arranged on the rear side of the mandrel above the arms C and rotatably supported by hooks or concave bearings *e*, which are secured to the mandrel about in line with the upper surface of the inclined arms. The beading-rod is provided with a longitudinal slot *e'*, in which one longitudinal edge of the sheet-metal blank is inserted. By then turning the rod in its supports the edge portion of the blank is curled around the rod, forming a curl or bead in a well-known manner. The beading-rod is provided near one end with a disk *f*, which bears against one end of the mandrel and which forms a stop or gage against which the end of the blank is placed. The blank is inserted endwise into the slot of the beading-rod from the opposite end thereof. This gage-disk is secured to a crank F, which can be permanently secured to the beading-rod. The latter is held against lengthwise displacement in one direction by the disk *f* and in



the other direction by a button *g*, which is secured to the end of the mandrel and bears against the outer side of the disk. The beading-rod is provided at its opposite end with  
 5 a detachable crank *F'*, held by a set-screw or other suitable device, two cranks being used for turning the rod, since the latter is long and slender. In the drawings the gage-disk is shown at the right-hand end of the machine, in which case the blank is inserted  
 10 from the left. When the location of the machine in the shop renders it desirable to insert the blank from the right, the arrangement of the beading-rod is reversed. For  
 15 that purpose the detachable crank *F'* is removed, the beading-rod is reversed, so as to bring the gage-disk on the left-hand end of the machine, the retaining-button attached to the left-hand end of the mandrel, and the  
 20 detachable crank is again secured to the rod. The cranks are so arranged on the rod with reference to the groove that when the rod is placed in the supporting-hooks and the cranks depend in the position which they naturally  
 25 assume by gravity the slot will be on the upper side of the rod, ready to receive the lower edge of the blank. The supporting-hooks project in rear of the mandrel and allow the blank to project upwardly behind  
 30 the mandrel, and the weight of the blank tends to hold the latter in the groove. This arrangement of the parts enables the operator to place the rod in the proper position for receiving the blank without paying particular attention and also without removing the mandrel.

*H* represents the forcing or forming bar, which is mounted horizontally above the mandrel in such manner that it can be swung  
 40 forwardly over the mandrel and downwardly against the same for bending the blank around the mandrel. This bar is supported by several pairs of jointed arms or links *I K*, arranged at suitable distances apart side by  
 45 side, as the length of the bar may require. Three pairs of such arms are shown in the drawings. Each pair of arms consists of a lower or rear arm *I* and an upper or front arm *K*. Each lower arm *I* is secured at its rear  
 50 end in a socket *i*, which is pivoted to an ear or lug *i'*, secured to the upper side of the table, near the rear end thereof, in such a way that the arm *I* projects upwardly from the socket and can be swung at its free end toward and  
 55 from the mandrel. The arm is secured in the socket by a set-screw *i*<sup>2</sup> and gib *i*<sup>3</sup> or other suitable means, whereby the arm can be adjusted forwardly or backwardly in the socket to adjust the free end of the arm from the  
 60 pivot when a larger mandrel is used or toward the pivot for a smaller mandrel. *l* is a convex bearing or face piece which is secured to the free end of each arm *I*, so as to face the mandrel. Each upper arm *K* is secured  
 65 at its rear end in a socket *k*, which is pivoted to the upper end of the lower arm *I* in such manner that the free end of the upper arm

can be swung toward or from the mandrel. The arm *K* is adjustably secured in the socket by a set-screw *k'* and gib *k*<sup>2</sup> as the lower arm  
 70 is secured in the socket, so that the forcing-bar can be adjusted toward or from the pivot to adapt it for operation with a smaller or larger mandrel. The upper end of each arm *K* is rigidly secured to the forcing-bar. 75

*M* represents the hand-levers by which the forcing-bar is manipulated. Four of these levers are preferably connected with the bar, as shown, so that the bar can be operated by two operators standing side by side, each  
 80 grasping two levers. These levers are arranged on the rear side of the bar and are pivoted to the latter by pivots *n*, arranged near the lower edge of the bar. Each lever is provided with a short arm or toe *O*, which  
 85 projects toward the mandrel. This toe is made of such size and form that it clears the mandrel and the blank bent against the same when the lever rests against the back of the forcing-bar, as shown in Fig. 6, but can be  
 90 brought to bear against the blank on the mandrel by swinging the lever away from the bar, as shown in Fig. 7.

The machine is operated as follows: Before the blank is inserted the forcing-bar is raised  
 95 and supported upon the shoulders of the standards, as shown in Fig. 4. The blank is then inserted endwise in the groove of the beading-rod, which latter is placed with its  
 100 groove uppermost, so that the blank projects upwardly from the rod in rear of the mandrel. The rod is then turned by means of the cranks for forming the head or curl at the edge of the blank which is confined in the groove of the rod. The forcing-bar is now swung for-  
 105 wardly, whereby the blank is bent over the mandrel. During this movement of the forcing-bar the latter bears against the blank, near the free end thereof, and the bearing-pieces of the lower supporting-bars *I* bear against  
 110 the blank about half-way between the fixed and free edges of the blank. By acting upon the blank at an intermediate line in this manner the blank is prevented from buckling and is more snugly pressed against the mandrel. 115  
 This forward swinging movement of both jointed bars *I* and *K* continues until the bearing-pieces press the blank firmly against the mandrel, as shown in Fig. 5. The further forward movement of the forcing-bar swings  
 120 the upper arms *K* on their pivots and continues until the free end of the blank has been pressed against the mandrel, as represented in Fig. 6. The forcing-bar is manipulated in this manner by means of the hand-  
 125 levers, which bear against the back of the forcing-bar. When the gutter has been completely formed, the hand-levers are swung away from the forcing-bar, so as to bring their short arms or toes to bear against the  
 130 bent trough near the free edge thereof. The toes of the levers now hold the free end of the trough firmly against the mandrel, and the toes form at the same time fulcrum on which



the levers turn and whereby the forcing-bar is swung away from the trough. The forcing-bar is in this manner removed from the free front portion of the trough without allowing the free end to spring away from the mandrel in releasing the forcing-bar. The further upward movement of the forcing-bar raises the bearing-pieces of the lower bars I also from the trough, and the forcing-bar is finally placed again upon the supporting-shoulders of the standards. The bent trough is then removed endwise from the mandrel.

I claim as my invention—

1. The combination with a frame, and a mandrel, of a forcing-bar adapted to be swung over the mandrel, supporting means for the forcing-bar pivoted to the frame and pivotally jointed between the frame and the forcing-bar, and means for adjusting said forcing-bar toward and from the frame, substantially as set forth.

2. The combination with a frame, and a mandrel, of a forcing-bar, lower supporting-bars pivoted to the frame, upper supporting-bars secured to the forcing-bar and pivoted to the lower supporting-bars, and means whereby the upper and lower supporting-bars can be adjusted lengthwise, substantially as set forth.

3. The combination with a stationary frame and a mandrel secured thereto, of a forcing-bar connected to the frame by supporting-bars which are jointed at their lower ends to the frame and pivotally jointed between their lower ends and the forcing-bar, and means whereby said supporting-bars can be adjusted lengthwise, substantially as set forth.

4. The combination with a stationary frame and a mandrel secured thereto, of a forcing-bar, upper supporting-bars secured thereto, lower supporting-bars pivoted to the frame, and sockets which are pivoted to the lower supporting-bars and in which the upper supporting-bars are secured, substantially as set forth.

5. The combination with a stationary frame and a mandrel secured thereto, of a forcing-bar, upper supporting-bars secured to said forcing-bar, lower supporting-bars, sockets which are pivoted to the frame and in which the lower supporting-bars are adjustably se-

cured, and sockets which are pivoted to the lower supporting-bars and in which the upper supporting-bars are adjustably secured, substantially as set forth.

6. The combination with a stationary frame, a cylindrical mandrel provided with downwardly and rearwardly projecting arms by which it is secured to the frame, bearings for the beading-rod arranged on the rear side of the mandrel above said arms, a beading-rod, supporting-bars which are pivoted to the frame below said mandrel on the rear side thereof, and a forcing-bar attached to the free ends of said supporting-bars, substantially as set forth.

7. The combination with a stationary frame provided with a rearwardly-sloping table, of a mandrel provided with inclined supporting-arms which are adjustably secured to said table, and a forcing-bar pivotally connected with the frame, substantially as set forth.

8. The combination with a stationary frame, and a mandrel secured thereto, of a slotted beading-rod which is rotatably supported, a gage-disk secured to one end of said rod, and a retaining-button which is secured to the mandrel and engages said disk, substantially as set forth.

9. The combination with a stationary mandrel and a pivotally-supported forcing-bar, of a hand-lever which is pivotally connected with said bar and which has its short arm arranged to clear the mandrel when the hand-lever bears against the forcing-bar and to engage the mandrel when the hand-lever is swung away from the forcing-bar, substantially as set forth.

10. The combination with a stationary mandrel and a pivotally-supported forcing-bar, of hand-levers which are pivoted to the rear side of the forcing-bar and which have their short arms projecting rearwardly and adapted to bear against the mandrel and swing the forcing-bar from the mandrel, substantially as set forth.

Witness my hand this 3d day of April, 1901.

JOHN H. CROCKER.

Witnesses:

JNO. J. BONNER,

CLAUDIA M. BENTLEY.