

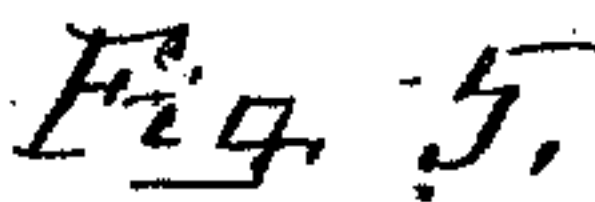
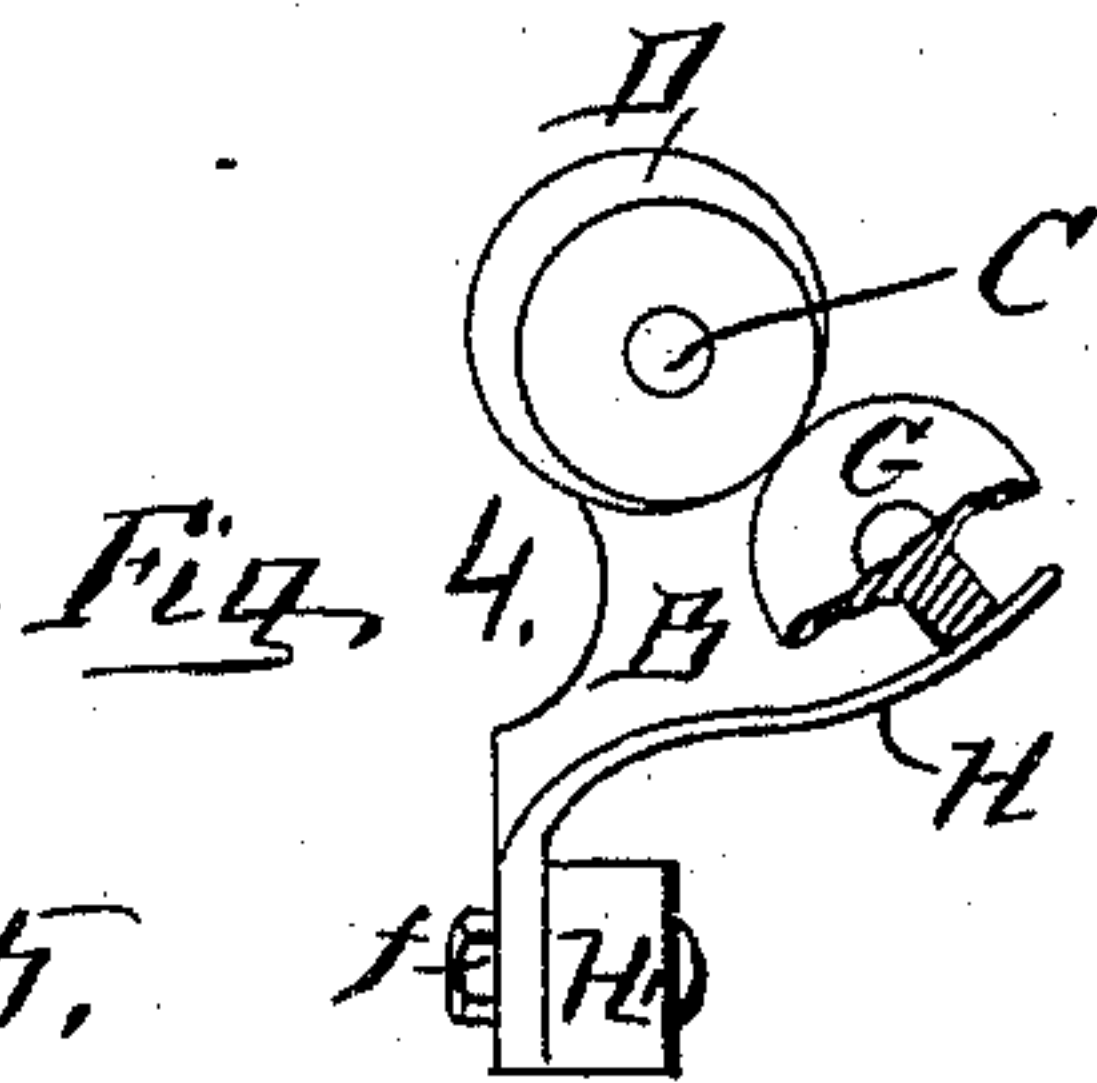
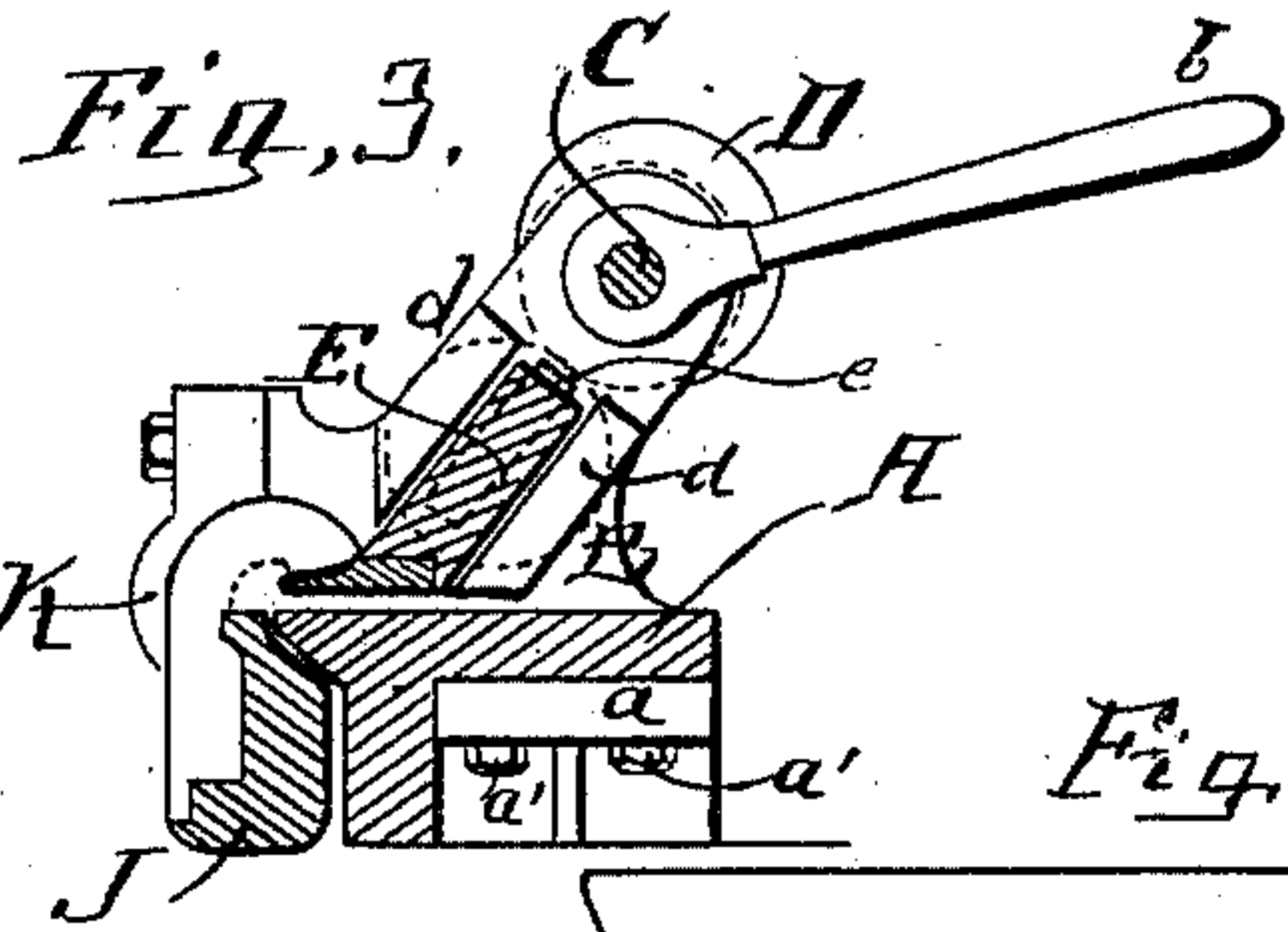
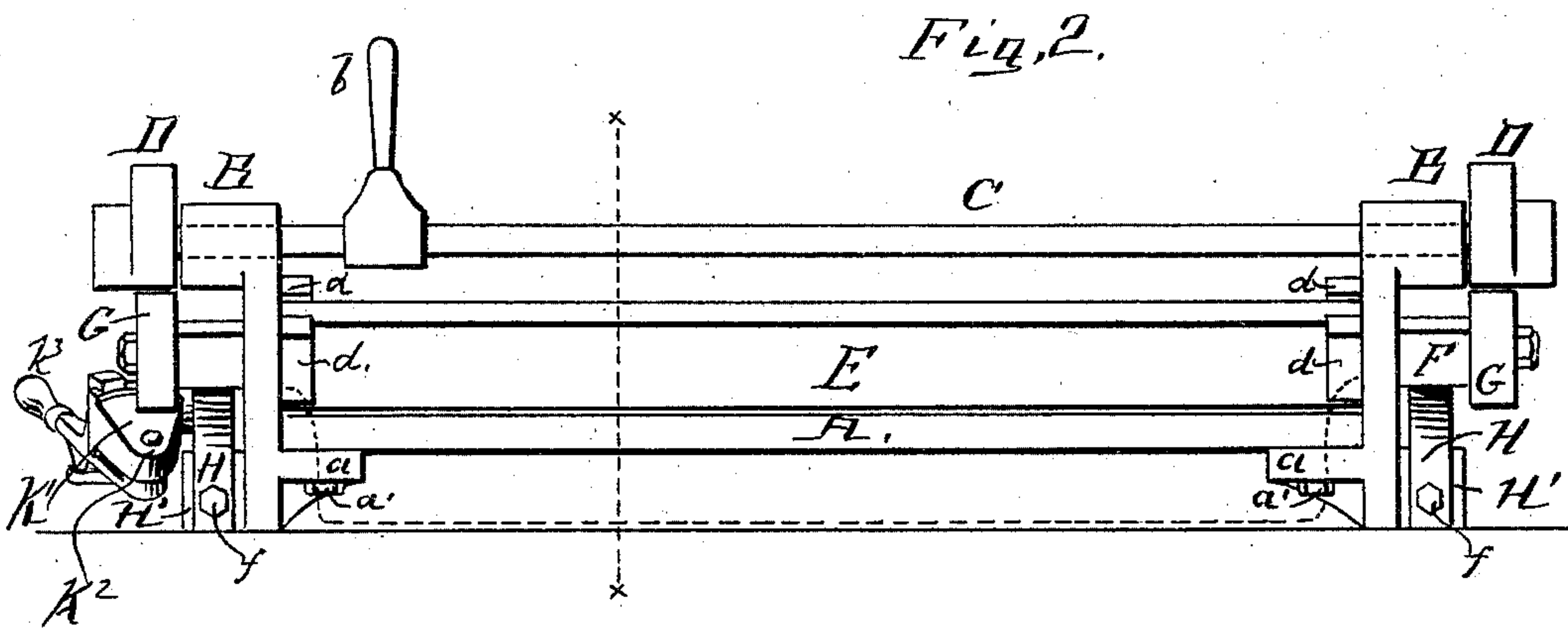
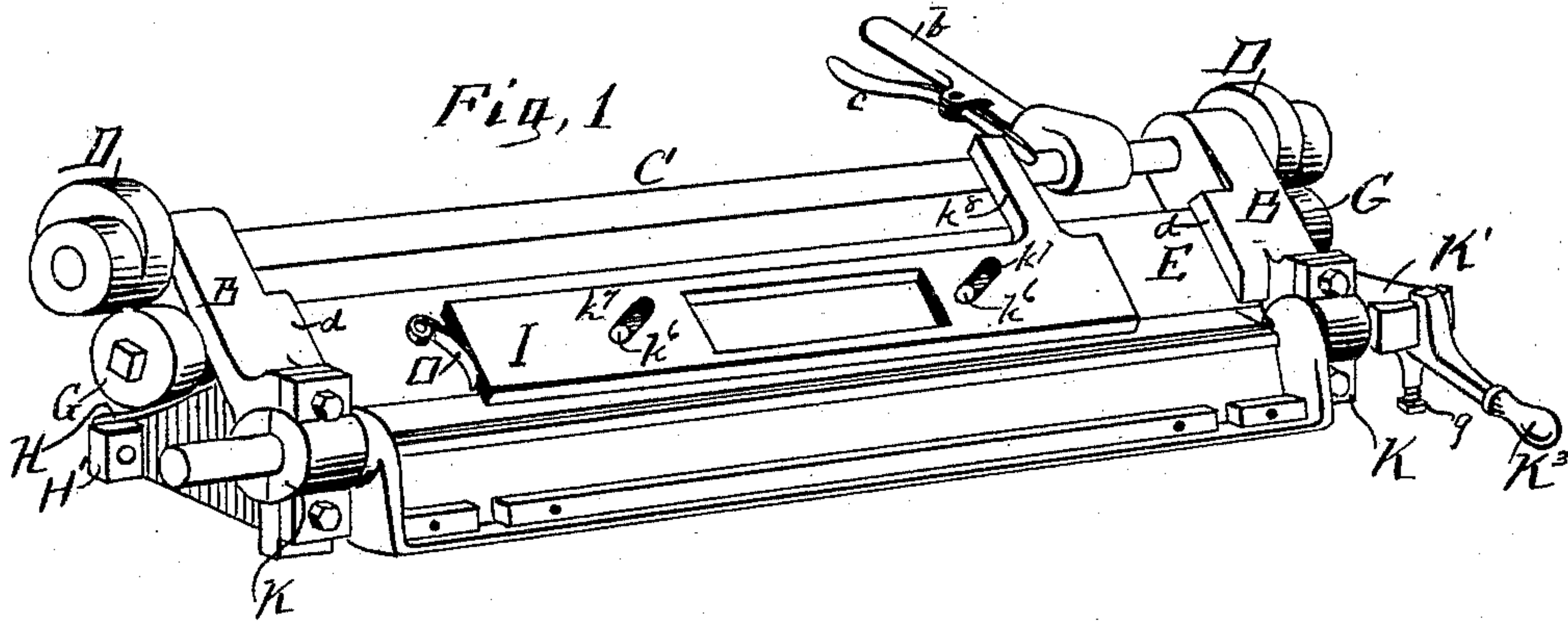
(No Model.)

2 Sheets—Sheet 1.

T. C. BELDING.
SHEET METAL FOLDING MACHINE.

No. 474,283.

Patented May 3, 1892.



WITNESSES,
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Chas M Standa

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Thomas C. Belding.
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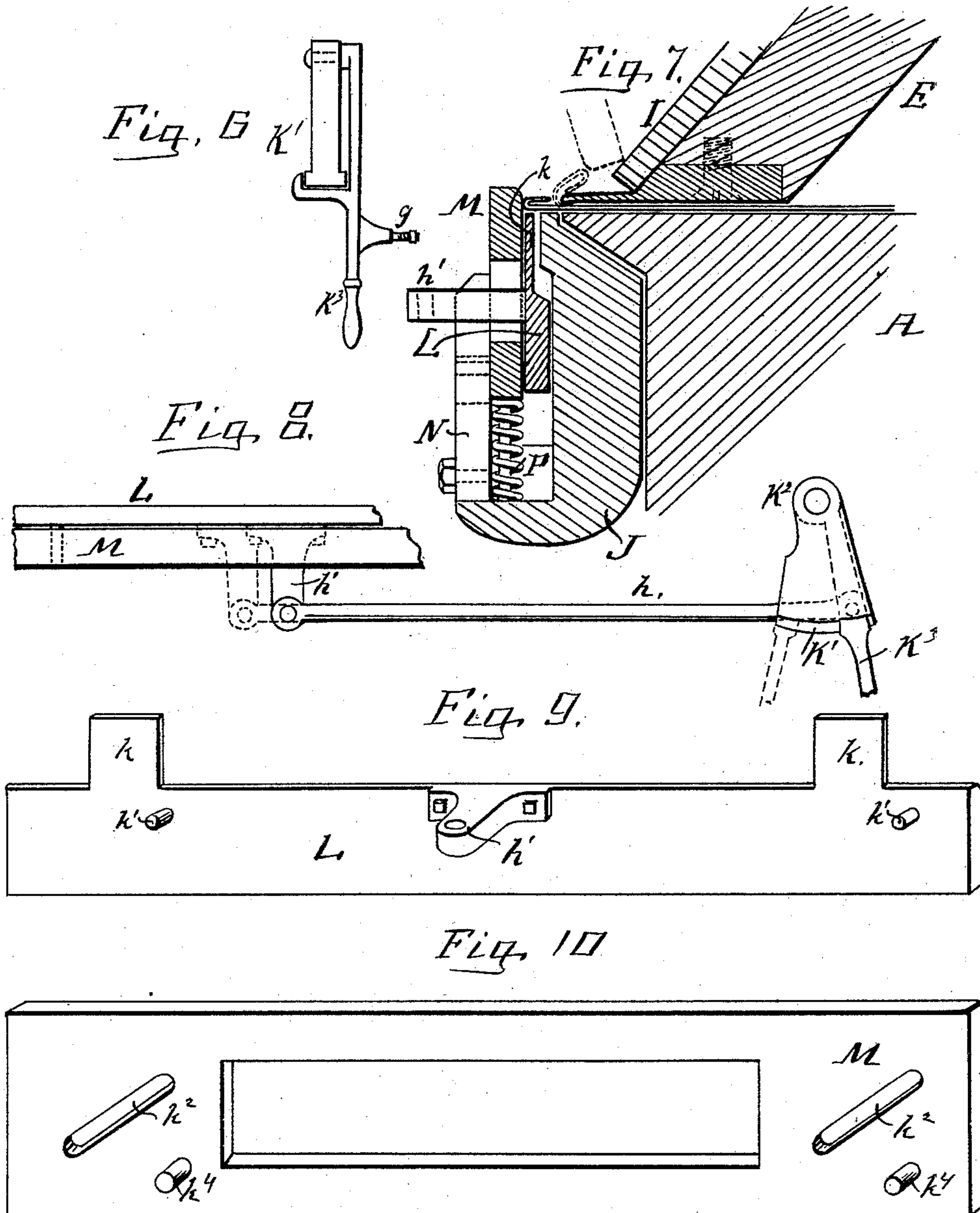
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2 Sheets—Sheet 2.

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Attorney

UNITED STATES PATENT OFFICE.

THOMAS C. BELDING, OF CANTON, OHIO, ASSIGNOR TO THE CANTON STEEL ROOFING COMPANY, OF SAME PLACE.

SHEET-METAL-FOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 474,283, dated May 3, 1892.

Application filed March 3, 1892. Serial No. 423,604. (No model.)

To all whom it may concern:

Be it known that I, THOMAS C. BELDING, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Folding-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference marked thereon, in which—

Figure 1 is a perspective view of the folding-machine, showing the gages removed. Fig. 2 is a rear view of the machine. Fig. 3 is a transverse section through line $x x$ of Fig. 2. Fig. 4 is a side view of one of the eccentrics, showing location of one of the rollers, also showing an edge view of the lifting-spring. Fig. 5 is a view showing a portion of the second or final folding-gage and illustrating one of its guide-plates. Fig. 6 is an edge view of the lever operating front folding-leaf and front gage. Fig. 7 is a transverse section showing the location of the gages attached to the front folding-leaf. Fig. 8 is a view showing rod connecting the operating-lever with front gages. Fig. 9 is a side view of the first gage, showing its stops. Fig. 10 is a side view of the final gage.

The present invention has relation to sheet-metal-folding machines; and it consists in the different parts and combinations of parts hereinafter described, and particularly pointed out in the claims.

Similar letters of reference indicate corresponding parts in all the figures of the drawings.

In the accompanying drawings, A refers to the base or bed plate, which may be of any desired length, reference being had to the width of the sheets designed to be folded. To the ends of the bed-plate A are securely bolted the end plates B, which end plates are provided with the inwardly-projecting flanges a , through which flanges the clamping-bolts a' pass, said clamping-bolts being preferably of the kind known as "cap-screws."

The end plates B are so constructed as to provide suitable means of attaching the different parts of the machine, as hereinafter

described. To the top or upper ends of the end plates B is journaled the shaft C, which shaft is located substantially as shown in Figs. 1, 2, 3, and 4, and, as shown, its ends are provided with the eccentrics D, which eccentrics are located just outside of the end plates B and are securely attached to the shaft C in any convenient and well-known manner. To the shaft C is securely attached the eccentric-shaft-operating lever b , which lever may be substantially as shown in Figs. 1 and 2. The lever b may be provided with the pivoted lever c , which pivoted lever is for the purpose hereinafter described. Below the shaft C is located the top clamping-bar E, which clamping-bar is located at an angle to the bed-plate and is held in position by the flanges d , which flanges are preferably formed integral with the end plates B, and are so located that they form grooves to receive the ends of the top clamping-bar E; but it will be understood that the flanges d may be formed separate from the end plates and attached in any convenient and well-known manner. The top clamping-bar E is provided at its ends with the extensions F, which extensions pass through elongated slots e , which elongated slots are formed in the end plates B. To the ends of the extensions F are journaled the rollers G, which rollers are located substantially as shown in Figs. 1, 2, 3, and 4.

For the purpose of normally holding the rollers G in contact with the eccentrics D, and at the same time elevate the top clamping-bar E and hold it in an elevated position, the springs H are provided, the free ends of the said springs abutting against the bottom or under edges of the extensions F, the opposite ends of said springs H being securely attached to the projections or lugs H' , formed upon the end plates B by means of the clamping-bolts f or their equivalents. To the front and upper face of the top clamping-bar E may be removably attached the sliding stop-bar I, which is located as shown in Figs. 1 and 7 and which will be hereinafter described. To the front edges of the end plates B is journaled the folding-leaf J by means of the boxes K. The end of the folding-leaf J is provided with the lever-bracket K' , which bracket is

provided with a rearward extension K^2 , to which rearward extension is pivotally attached the front-gage operating-lever K^3 , said lever K^3 also being for the purpose of operating the front folding-leaf J, as hereinafter described. The lever K^3 is provided with the post or stud g , which post or stud is for the purpose of providing a means for pivotally attaching one end of the gage-connecting bar h , the opposite end of said gage-connecting bar being pivotally attached to the bracket or arm h' , which bracket or arm is securely attached to the front or first gage L. The front bending-gage is located between the folding-leaf J and the rear or final gage M, substantially as shown in Fig. 7. The front or first gage L is provided with the projections k , which projections are located substantially as shown in Figs. 7 and 9, and are for the purpose of providing stops or gages for the sheet metal designed to be folded at the first bend or fold of the sheet. The front or first gage L is provided with the pins k' , which pins are for the purpose of engaging the longitudinal diagonal slots k^2 , located in the final gage M. The final gage M, Fig. 10, is shown provided with the pins k^4 , which pins are for the purpose of engaging the slots k^5 in the gage-supports N, which gage-supports are securely attached to the front lower edge of the folding-leaf J.

The object of the machine proper is to form two folds or bends upon the edge or end of the sheet metal, which have different widths and different angles to the sheet of metal, which folds are of different widths.

In use the operating-lever K^3 is pushed or forced outward or away from the bracket h' , which movement draws the front gage upward by means of the pins k' and the inclined slots k^2 , thereby elevating the stops k , so as to bring them above the top edge of the folding-leaf J, after which the sheet metal designed to be folded is placed between the bed-plate A and the top clamping-bar E, it being understood that the top clamping-bar E is to be elevated by means of the springs H, the eccentric-shaft C being adjusted by the lever b so as to bring the eccentrics D into the position illustrated in Fig. 1, thereby freeing the top clamping-bar E and permitting the springs H to elevate said clamping-bar. The sheet metal designed to be folded is passed through between the parts above described until the edge or end comes in contact with the stops k , at which time the lever b is pulled forward until the eccentrics force the top clamping-bar E downward until the sheet is firmly clamped between the bed-plate A and said top clamping-bar E, the sliding stop-bar I being located in the position illustrated in Fig. 1, which position brings or places the said sliding stop-bar out of the way of the final gage in making the first bend, this position being its normal position, and is held in the position by means of the spring O, which spring forces the sliding stop-bar I endwise until the pins

k^6 strike the bottom or lower ends of the inclined slots k^7 . The folding-leaf J is turned upward and over by means of the lever K^3 , which lever is given an upward and backward movement; or, in other words, the free end of the lever K^3 describes an arc of a circle in its movement as the folding-leaf J is brought into action, when the folding-leaf J is rotated upon its pivotal points by means of its lever K^3 . The top or upper edge of the folding-leaf J forces the metal upward and over until it is pressed tightly against the top or upper portion of the front edge of the top clamping-bar. For the purpose of allowing the upper edge of the front folding-leaf J to approach closely to the top of the front edge of the top clamping-bar E, and thereby carry the metal over onto the front edge of said top clamping-bar, the springs P are provided, which springs permit the gages to be forced backward, or, in other words, provide a yielding movement to said gages, said springs P being so located and arranged that they will normally hold the gages in an elevated position, after which the lever K^3 is brought into the position illustrated in Fig. 1 and forced toward the gages, as illustrated by the dotted lines in Fig. 8, which movement forces the front gages downward by means of the pins k' and the inclined slots k^2 . The eccentrics D are again brought into the position illustrated in Fig. 1 by means of the shaft C and the lever b , thereby elevating the top clamping-bar E and releasing the sheet of metal, at which time the sheet of metal is pushed forward against the final gage, as shown in Fig. 7. The top clamping-bar is again brought down upon the sheet of metal by means of the eccentric, and the sliding stop-bar I is forced downward by means of the lever c , the top or upper end of which lever is pressed toward the lever b , thereby forcing the lower end of said lever c away from the lever b , which movement forces the sliding stop-bar I endwise and lowers the same into the position shown in Fig. 7. The folding-leaf J is again swung upon its pivotal points, which movement carries with it the first bend and also that portion of the sheet which comes directly above the top or upper edge of the folding-leaf or final gage M, striking against the stop I, thereby leaving the final fold at a different angle from the first fold. As the final gage M strikes the stop I, it is forced backward upon its springs P until the pins k^4 strike the bottom of the slots k^5 , which stopping-pins provide no further movement of the final gage M, thereby leaving the final fold at a different angle from the first fold, as shown in Fig. 7. This final fold being made or finished, the folding-leaf J is again swung upon its pivotal points until it assumes the position illustrated in Figs. 1 and 7, after which the sheet is released by the eccentrics, as above described. For the purpose of causing the top or upper edge of the folding-leaf J to travel in the arc of a circle around the front edge of the top clamping-

bar said folding-leaf J is so journaled that the center of the arc described in its movements will be its pivotal point, thereby holding the top or upper edge of the folding-leaf J at an equal distance from the front edge of the top clamping-bar E during the movement or travel of the folding-leaf J. The object and purpose of providing two folds upon the edges or ends of the sheet metal is to provide what are commonly known as "double cross-lock seams." The stop-bar I is provided with the arm k^8 , which arm is located substantially as shown in Fig. 1; and, as shown, it is so arranged that the bottom or lower portions of the pivoted lever c will act upon said arm, communicating motion to the stop-bar I.

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

1. In a sheet-metal-folding machine, the combination of the bed-plate provided with the end plates having journaled thereto the shaft C, provided with the eccentrics D and the operating-lever b , the top clamping-bar E, located at an angle to the bed-plate and provided with the extensions F, having journaled to said extensions the rollers G, the springs H, and the folding-leaf J, pivoted or

journaled to the bed-plate and carrying the movable gages L and M, substantially as and for the purpose specified. 30

2. The combination of the bed-plate A, the end plates B, fixed to said bed-plates, the folding-leaf J, journaled to the end plates B, the gage L, provided with the stops k and the pins k' , the operating-lever K^3 , fixed to the folding-leaf J by means of the bracket K' , the pin or stud g , the connecting-rod h , the diagonal slots k^2 , and the top clamping-bar E, substantially as and for the purpose specified. 35 40

3. The combination of the bed-plate A, the end plates B, the lifting-springs H, the shaft C, provided with the eccentrics D, the lever b , the top clamping-bar E, provided with a suitable stop, the folding-leaf J, having attached thereto the front gage L and the final gage M, the operating-lever K^3 , the connecting-bar h , and the gage-supports N, substantially as and for the purpose set forth. 45

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses. 50

THOMAS C. BELDING.

Witnesses:

T. C. SNYDER,
F. W. BOND.