

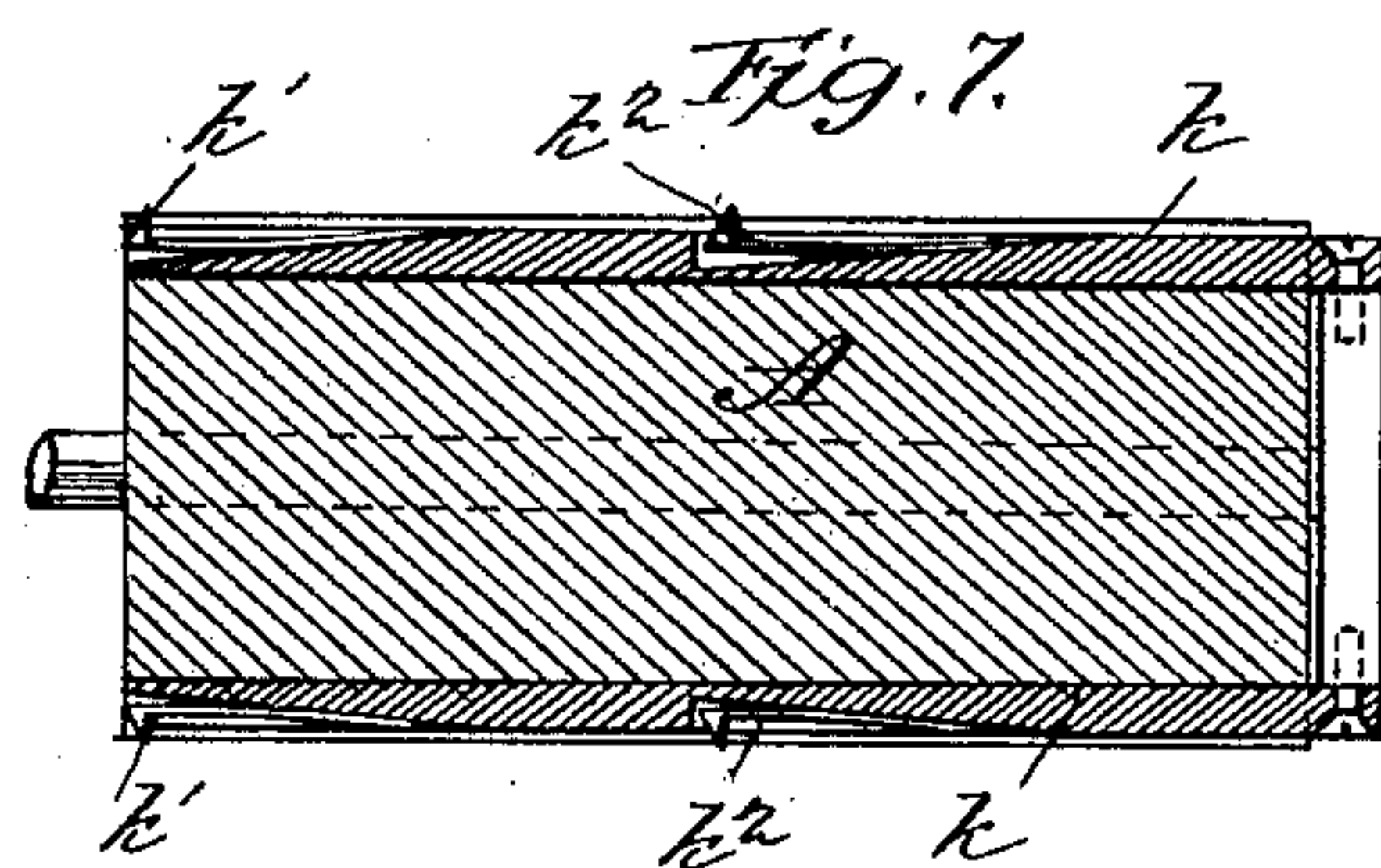
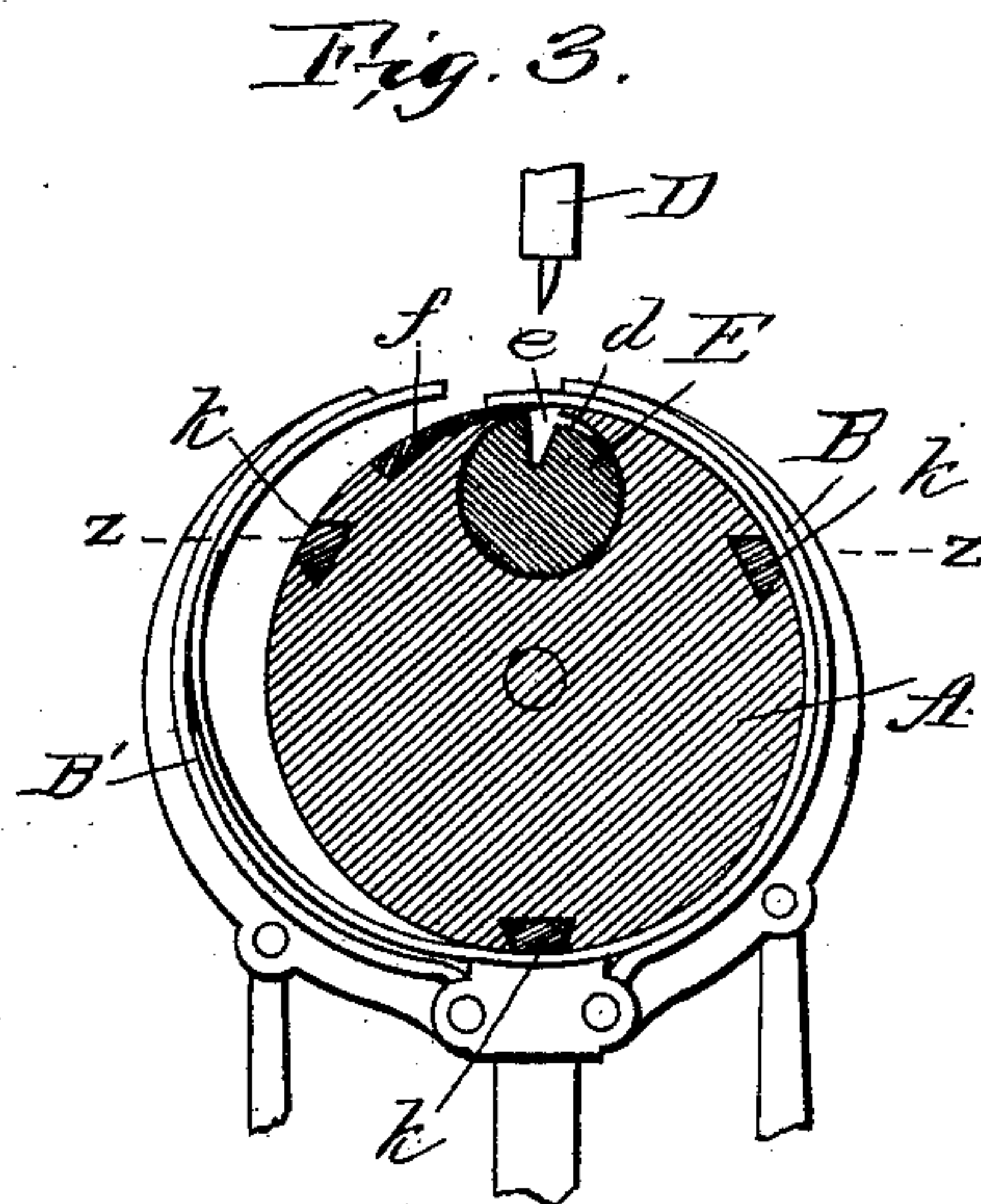
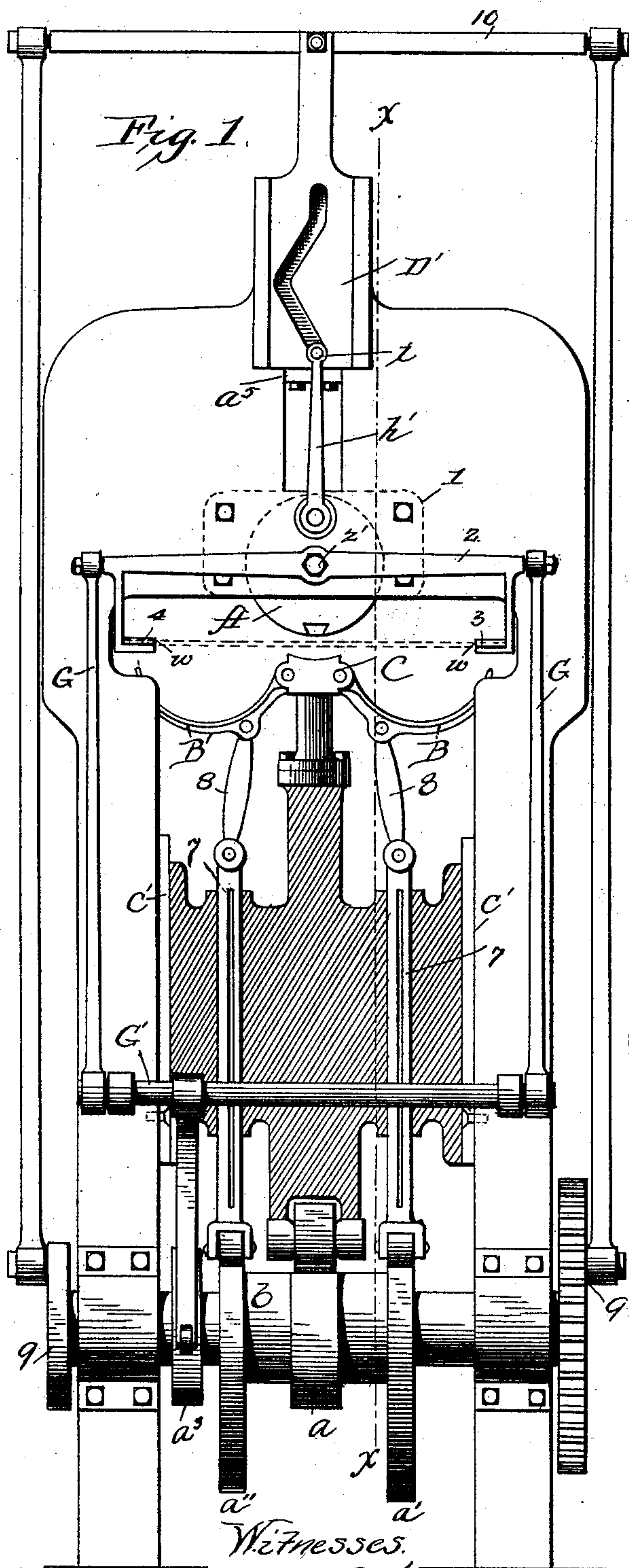
(No Model.)

3 Sheets—Sheet 1.

J. SOLTER.  
METAL SEAMING MACHINE.

No. 411,071.

Patented Sept. 17, 1889.



Witnesses.  
Walter C. Stone.  
Walter C. Stone.

Inventor  
John Solter  
by Eli C. Gann  
Atty.

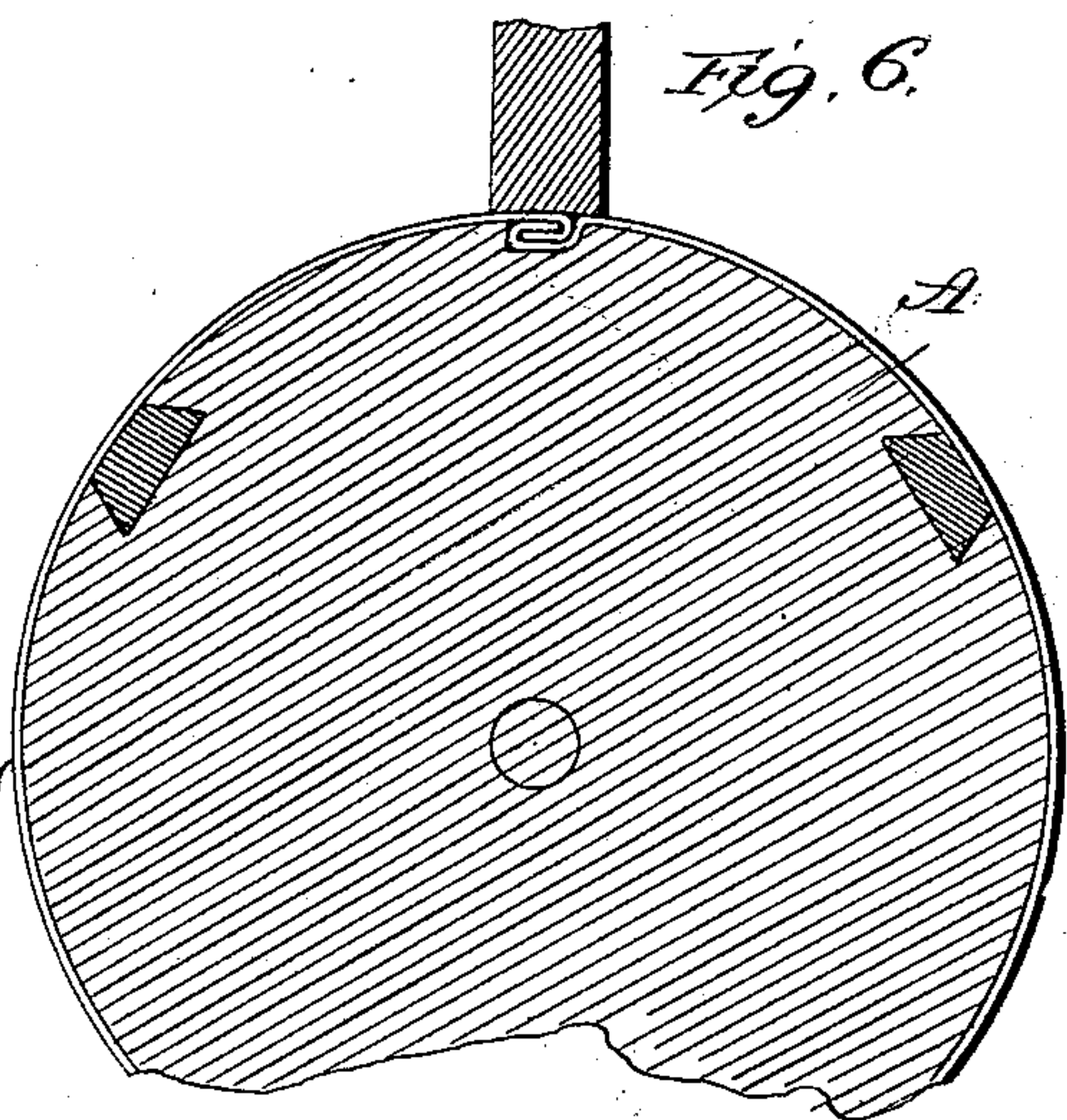
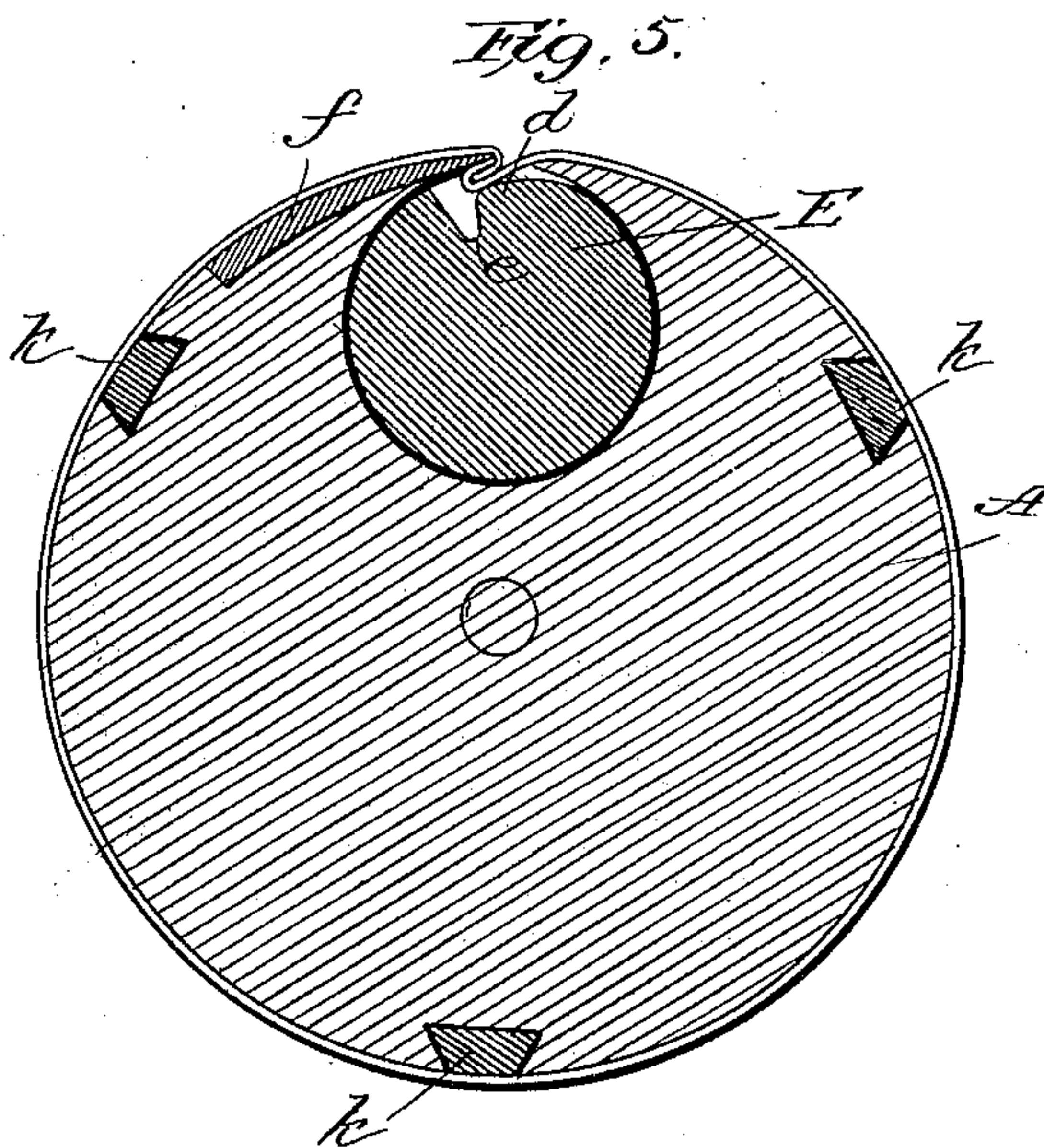
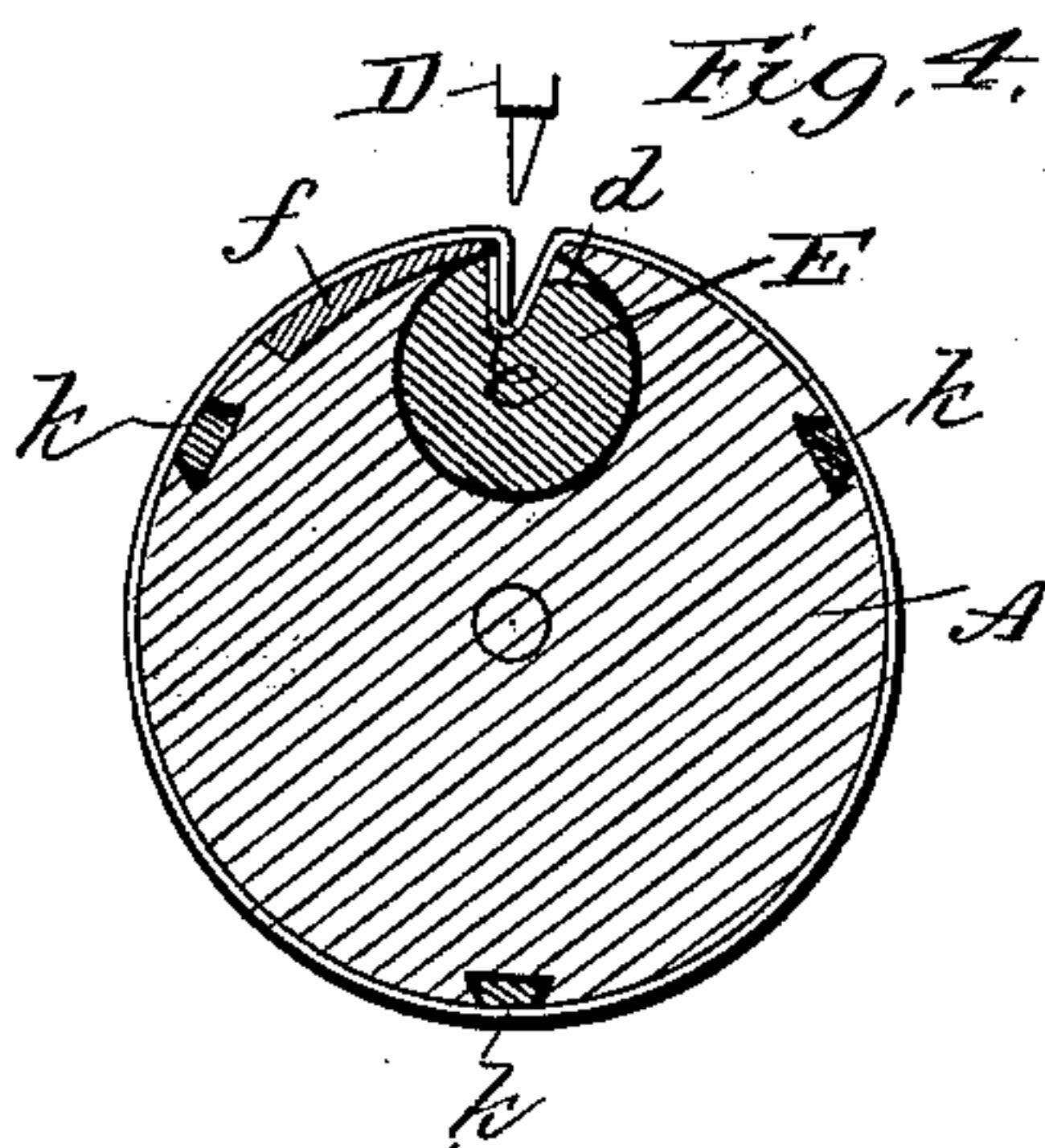
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3 Sheets—Sheet 2.

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*Attest*  
*Walter Donaldson*  
*W. P. Keene.*

*Inventor*  
*John Solter*  
*by Wm. C. ...*  
*Atty.*



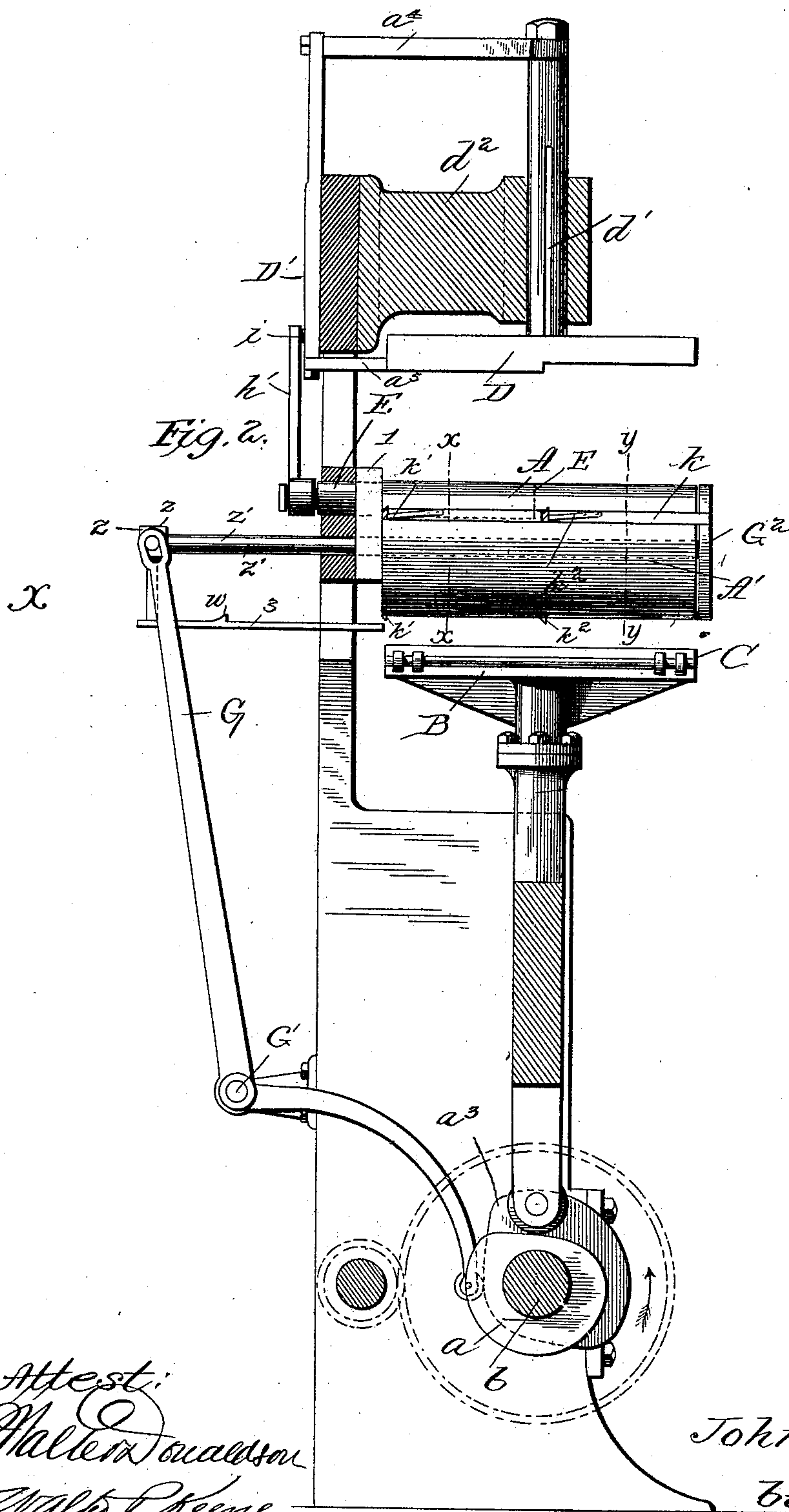
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3 Sheets—Sheet 3.

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Attest:  
*Walter Donaldson*  
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# UNITED STATES PATENT OFFICE.

JOHN SOLTER, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-HALF TO  
GEORGE L. KREBS, OF SAME PLACE.

## METAL-SEAMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 411,071, dated September 17, 1889.

Application filed May 28, 1889. Serial No. 312,386. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN SOLTER, of Baltimore, in the State of Maryland, have invented a new and useful Improvement in Seaming-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention is designed to make lock-seams and for forming articles of sheet material, such as metallic boxes or cans, and includes means for giving the material proper shape and means for uniting the meeting edges of said material to form the said seam. I aim to provide a machine which will first bend the sheet metal into proper form with its meeting edges overlapping and then bend or crimp said overlapping edges to produce a lock-seam. The machine comprises a former about which the metal is bent, means for pressing and holding the metal to said former, and a bending-plunger acting upon the sheet metal after the edges of the metal have been overlapped in order to bend said edges to form the seam. It also comprises a crimping device which acts upon the edges as bent by the plunger for further finishing the seam; and, further, it comprises the special construction of the former, in combination with the plunger for giving the final finish to the seam.

The features of novelty are pointed out in the claims.

In the drawings, Figure 1 is a front view with parts in section. Fig. 2 is a vertical section on line  $xx$  of Fig. 1 with parts removed. Fig. 3 is a transverse section through the former with the metal partially bent and clamped. Fig. 4 is a transverse section through the former on line  $xx$  of Fig. 2, showing the metal after being bent at its edges by the bending-plunger. Fig. 5 is a similar view showing the operation of the crimper. Fig. 6 is a section on line  $yy$  of Fig. 2. Fig. 7 is a detail sectional view through the former on line  $zz$  of Fig. 3.

In the drawings, A is the former or work-support—in the present instance of cylindrical form. It is supported at the front end by the bracket 1, bolted to the frame. The other end is free from support, the united blank having to be discharged here. The former is

slightly more than twice as long as the width of the blank, so that two of the can-bodies or other articles can be supported thereon at once with a small space between them. The sheet material is fed to the machine from point  $x$  in Fig. 2, so as to rest upon ledges 3 4. These ledges are carried by a cross-arm  $z$ , which is upon a rod  $z'$ , working through the center of the former. The cross-arm is moved by levers G on a rock-shaft G', operated by a cam  $a^3$  on the main shaft. The blank having been laid upon the ledges with its front edge resting against the lugs  $w$ , the movement of the lever G and cross-head will carry the said blank into position beneath the former.

The shaping devices consist of the former A, combined with the clamps B B' on each side thereof, pivoted to the bar C, extending beneath the former A. This bar is supported by a cross-head which reciprocates in guides C' of the frame and is operated by a cam  $a$  on the shaft  $b$ . This bar, when forced upward, grips the blank against the former and holds it in accurate position for the action of the shaping-clamps B B'. This bar also serves as a support for the former throughout its length during the formation of the lock-seam, as hereinafter mentioned.

The clamps B B' are operated by cams  $a'$   $a''$  on the shaft  $b$  through sliding bars 7 and links 8. The bars 7 are guided through openings in the cross-head. When the clamps are in their lowest positions, they lie entirely below the line of feed of the blanks. The cams are timed so that the grip-bar C will move first and grip the blank to the former. The clamps will be operated simultaneously; but the rise of one, as B, slightly exceeds that of the other, and thus, as in Fig. 1, one edge of the blank gets into position, and then the other edge is laid upon it to form the overlap. One clamp may start before the other, if desired, though I prefer the movement above described.

The seam-forming devices consist of the plunger D and the crimping-mandrel E, each of a length about equal to the width of the blank. The plunger-rod  $d'$  moves in an opening of the bracket  $d^2$ . The crimper is supported within a recess at the upper part of the former, and said crimper is formed with a longitudinal groove  $e$  and a crimping-shoulder.



der  $d$ . The crimper is partially revoluble, and in conjunction with it I employ a removable blade  $f$ , secured within a recess in the former. When the crimper is turned, the groove and shoulder are carried slightly past the end of the blade. While the blade is shown as removable, it is practically a part of the former, and may be integral therewith, it being only necessary in order to allow the crimper to perform its function that a bearing-edge be provided under which the crimper forces the metal. The plunger D is adapted to the groove in the crimper, and when it descends it bends the overlapping ends of the blanks and forces them into the said grooves, as in Fig. 4, thus uniting them. This operation of the plunger is produced by face-wheels 9 on the shaft  $b$ , connected to cross-arms 10 of the plunger-rod  $d'$ .

It will be obvious from the foregoing that for the purpose of uniting the edges the crimping-mandrel is not necessary, as the groove might be provided in the former itself and the united edges might be finished into a lock-seam by other means. The crimper, however, provides a simple, convenient, and effective means for finishing the seam.

The operation of the crimper takes place during the retraction of the plunger, the crimper having a crank-arm  $h'$ , with a stud or roller  $i$  projecting into a cam-groove in the cam-plate  $D'$ . This plate is supported and operated by arms  $a^4$  and  $a^5$ , which move with the plunger. Fig. 4 shows the crimper as fully operated and the lock-seam as formed between the blade and the crimping-shoulder, the united edges of Fig. 3 being bent aside. The can-body thus formed is forced or discharged from this part of the machine by spring-catches  $k'$  on bars  $k$ , movable in grooves in the former. The bars are connected with a disk or head  $G^2$ , which is secured to the rod  $z'$ , operated by the feed-levers G. The catches engage with the front edge of the can-body, and the movement of the bars  $k$  is sufficient to force the body back, so that it will be upon the rear part  $A'$  of the former, and this action takes place when the feed-levers G, with their ledges, move to feed in a new blank. At this part  $A'$  of the former, which is representative of a second work-support, the seam is further finished, for which purpose the rear end of the plunger has a plain face, and the former is preferably grooved, as in Fig. 5. The final action upon one body thus takes place simultaneously with the uniting action upon the new blank, and the same means are employed to effect both actions. The descent and action of the plunger upon the blank occur while the grip-bar C is up against the blank, and thus the former is securely supported throughout its extent and prevented from being strained when the plunger exerts its pressure. The completed body is discharged from the rear end of the former when the blank is moved to the second station  $A'$ , this action being produced by a second set of spring-

catches  $k^3$  on bar  $k$ . The blank having been placed upon the ledges 3 4, the feed-lever G moves rearward and carries the same beneath the former. The clamp-bar then elevates against the blank to hold it, and then the clamps B B' bend the blank about the former. The next action is that of bending the meeting edges of the metal into the groove of the crimper, and this is effected by the descent of the plunger D. Immediately following this is the action of the crimper. During all these operations the feed-levers and bars have remained in their rearward position, and when the material is clamped the spring-catches are forced inward and thus retained until the return of the feed-lever to normal position and the release of the clamp, which actions are the next to occur. A new blank is now placed and the above operation is repeated, the can-body just operated upon being moved to the portion A of the former for finishing by the forward series of catches. Here the seam is completed by the rear part of the plunger and discharged by the second set of catches simultaneously with the feeding of another new blank and the changing of the position of the partially-completed body. The former may be lightened, as in Fig. 1.

I claim—

1. In combination, the former for supporting the work, having a recess to receive a crimper and having a blade  $f$ , a revoluble crimper within said recess of the former, said crimper being formed with a recess, and a plunger co-operating with said recessed crimper to unite the edges of the metal, said crimper acting in connection with the blade  $f$  to crimp the united edges, substantially as described.
2. In combination, the former or work-support, the plunger, the revoluble crimper, and an operating-connection from said crimper to the plunger for moving the crimper, substantially as described.
3. In combination, the work-support, the plunger, the crimper, the crank-arm connected thereto, and the cam moving with the plunger for operating said crank-arm, substantially as described.
4. In combination, the former or work-support having a front recessed portion, a revoluble crimper therein extending approximately half-way to the rear, and a plunger to act in conjunction with said crimper in the front portion for uniting the edges of the blanks, the said former having a rear part constituting a second former or work-support, the said plunger also having a rear part constituting a second plunger for finishing the seams, substantially as described.
5. In combination, the former or work-support having a front recessed portion, a revoluble crimper therein extending approximately half-way to the rear, and a plunger to act in conjunction with said crimper in the front portion for uniting the edges of the blanks, the said former having a rear part constituting a second former or work-support, said rear



part being grooved to finish the seam, the said plunger also having a rear part constituting a second plunger to act in conjunction with the grooved rear part for finishing the  
5 seams, substantially as described.

6. In combination, the former, the revolvable crimper for uniting the metal, and the discharge comprising the automatic lever G, discharge-bars for engaging the metal, and the  
10 connection between the same and the lever, substantially as described.

7. In combination, the former supported at one end, means for uniting the material, in-

cluding a plunger, a grip C, and means for positively reciprocating said grip to and from 15 the former and for rigidly holding the same to support the former during the impact of the plunger, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two sub- 20 scribing witnesses.

JOHN SOLTER.

Witnesses:

FELIX R. SULLIVAN,  
GEO. E. SAVILLE.