(No Model.) 4 Sheets—Sheet 1.

T. L. SMITH & W. S. DOIG.

CAN SEAMING MACHINE.

No. 273,774. Patented Mar. 13, 1883.

Fig. 1.

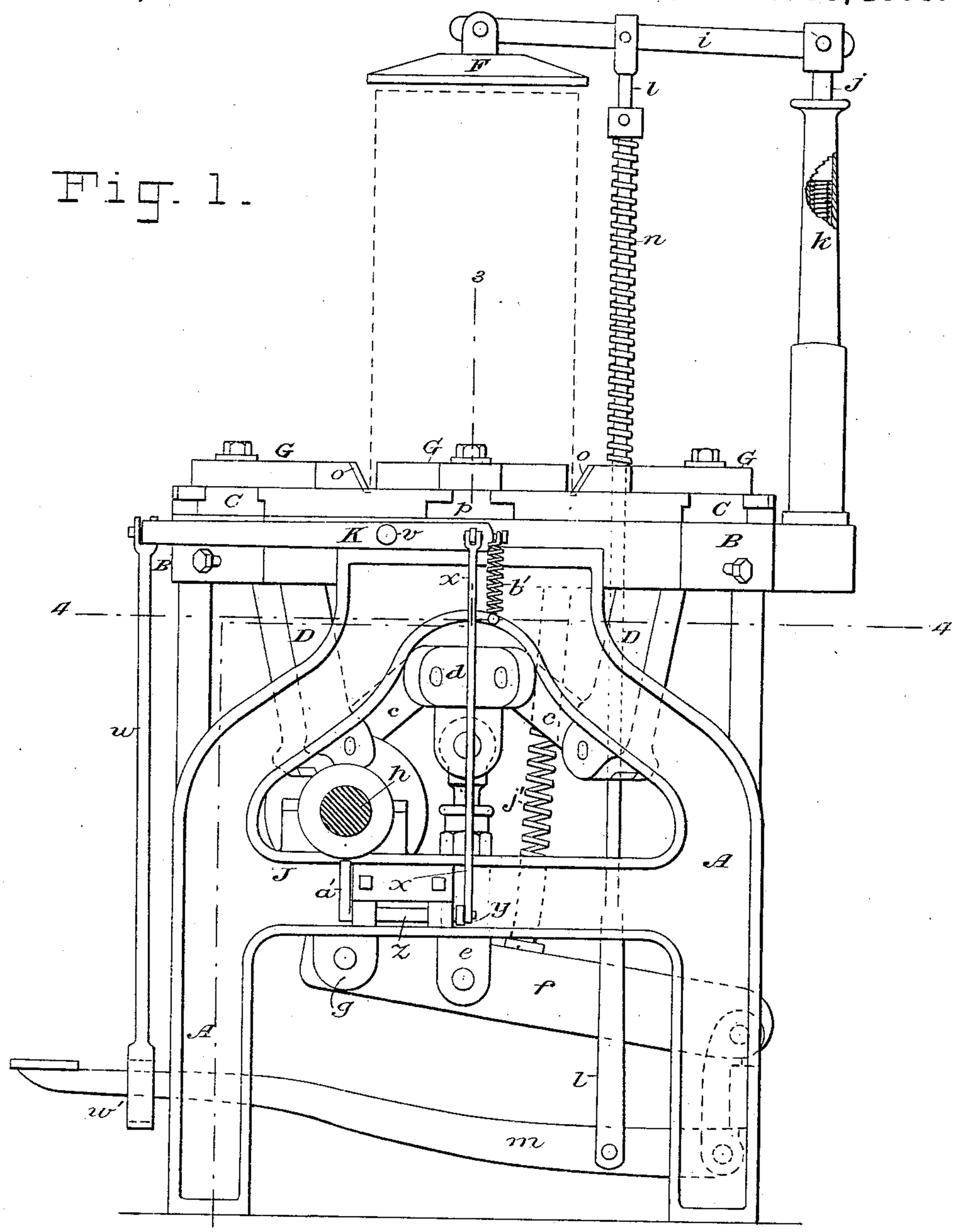


Fig. 8.

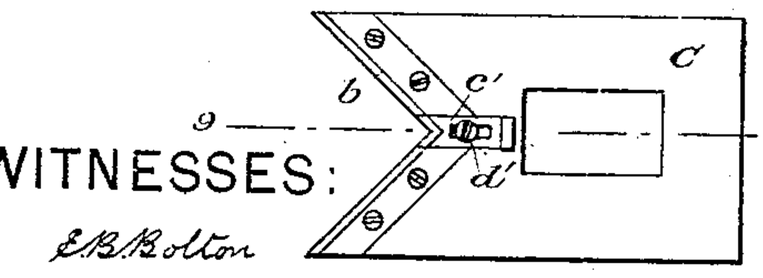
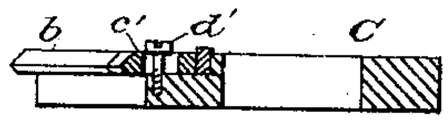


Fig. 9.



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4 Sheets—Sheet 2.

CAN SEAMING MACHINE.

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Fig. 2.

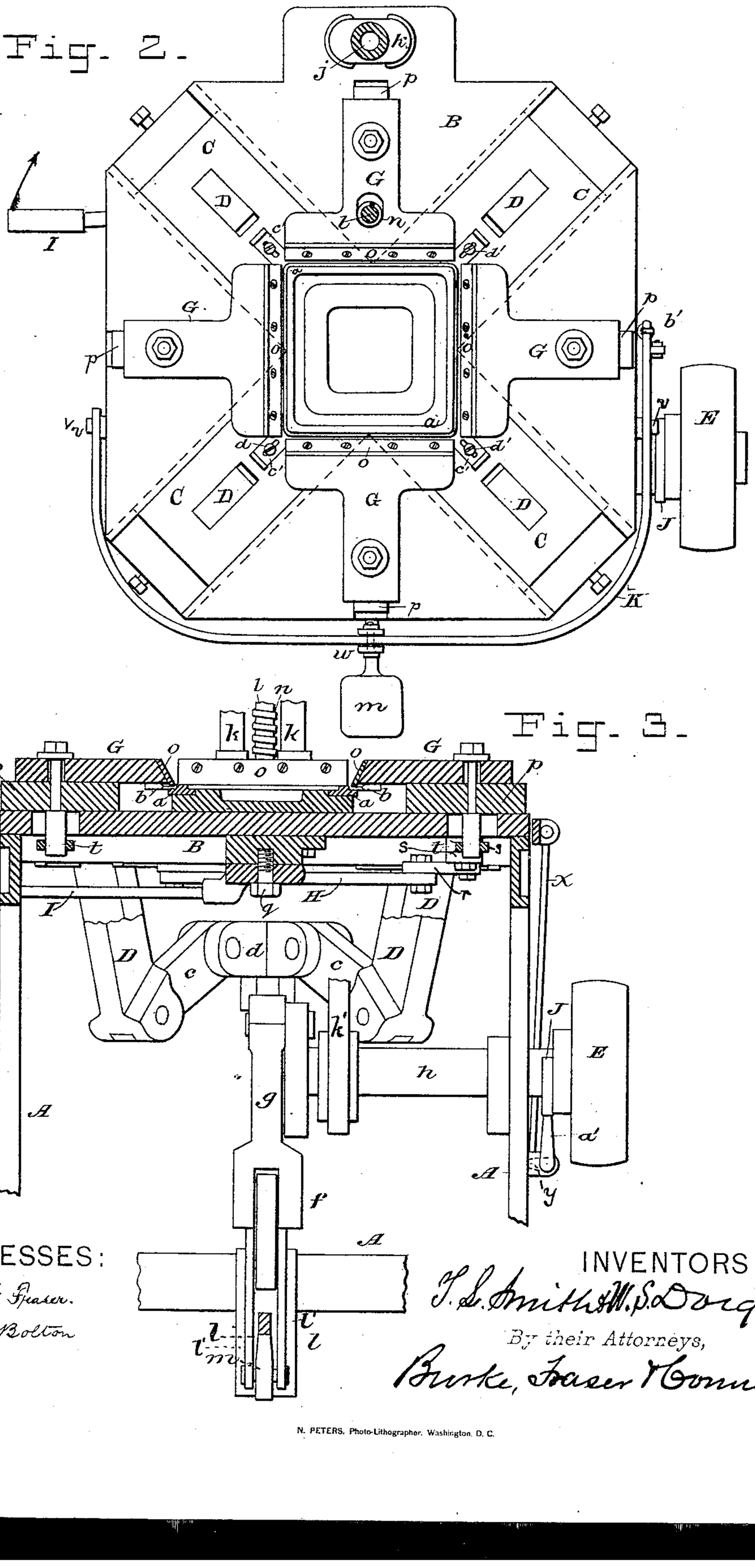

Fig. 3.

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CAN SEAMING MACHINE.

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Fig. 4.

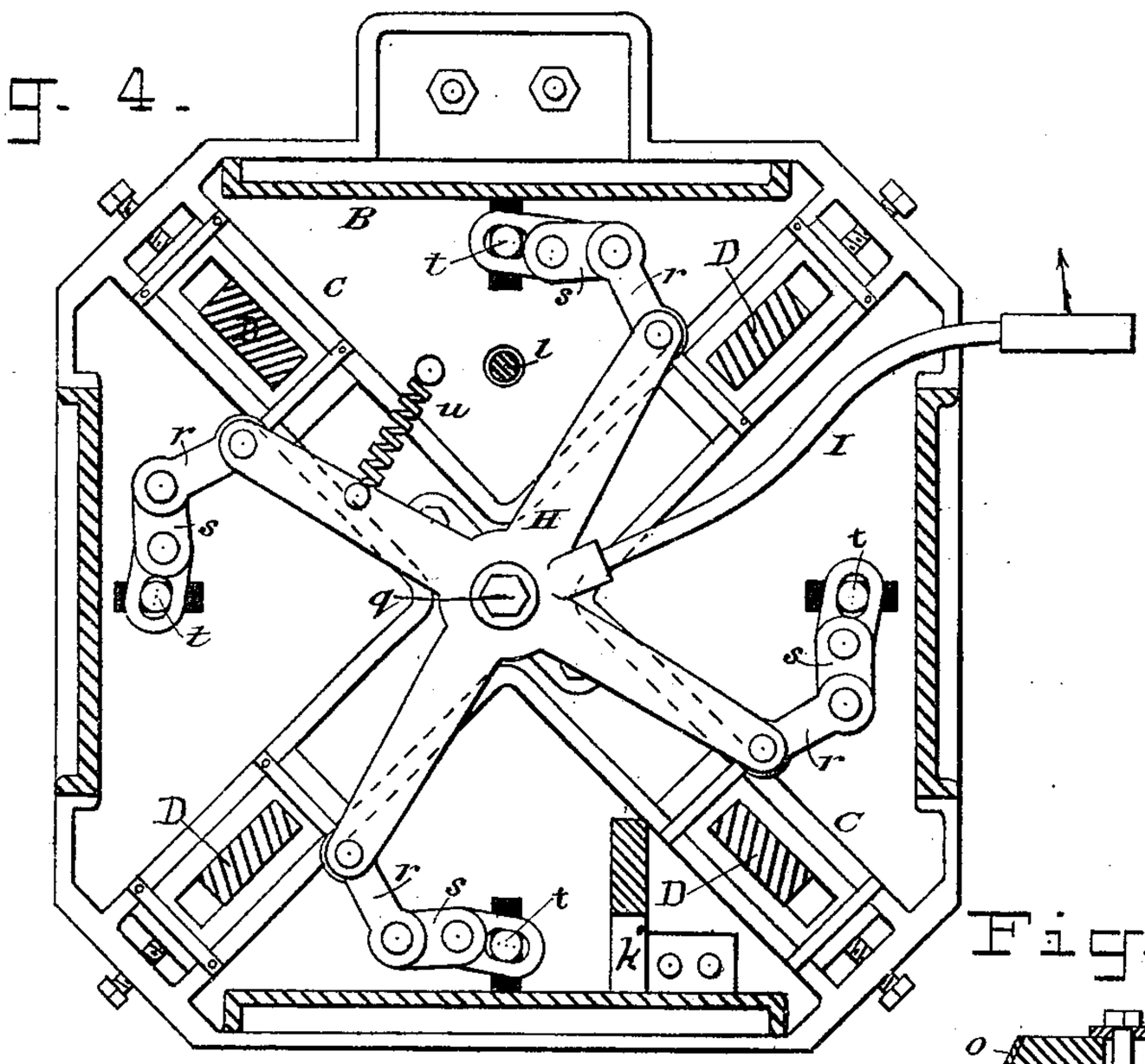


Fig. 7a.

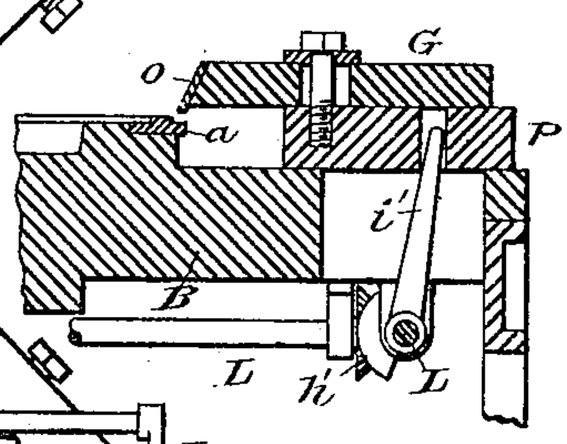
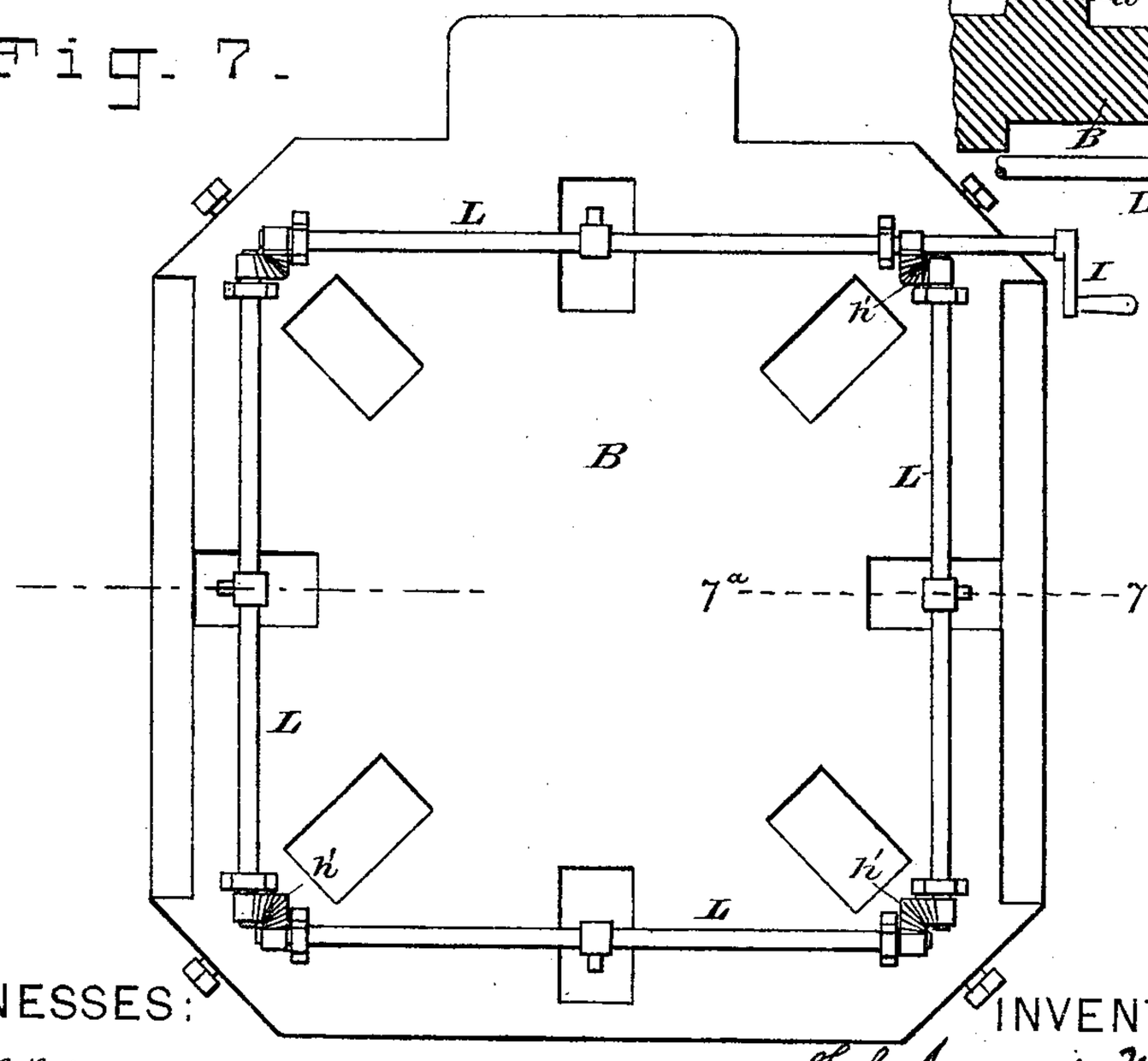


Fig. 7.



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T. L. SMITH & W. S. DOIG.

CAN SEAMING MACHINE.

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Fig. 5.

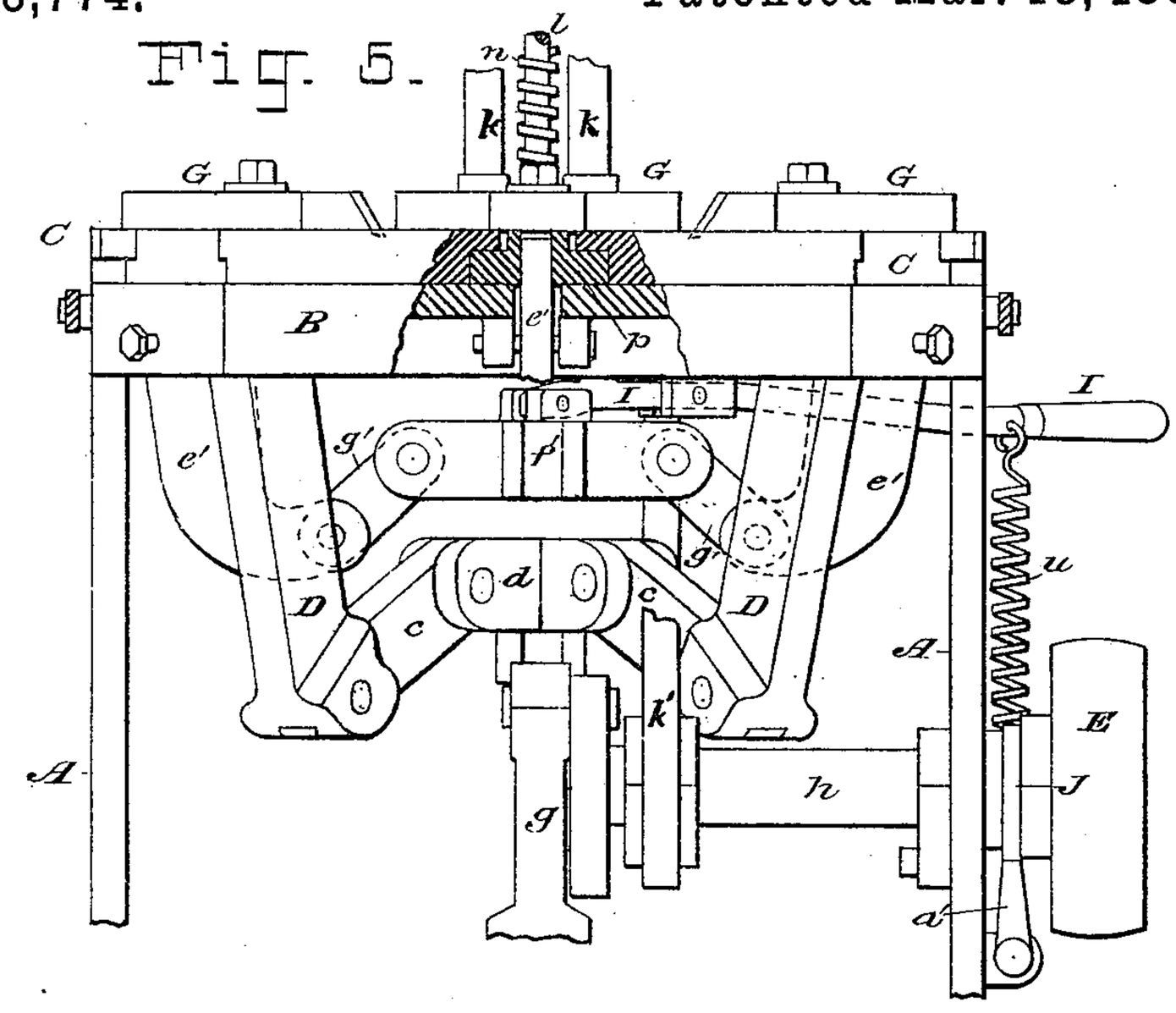
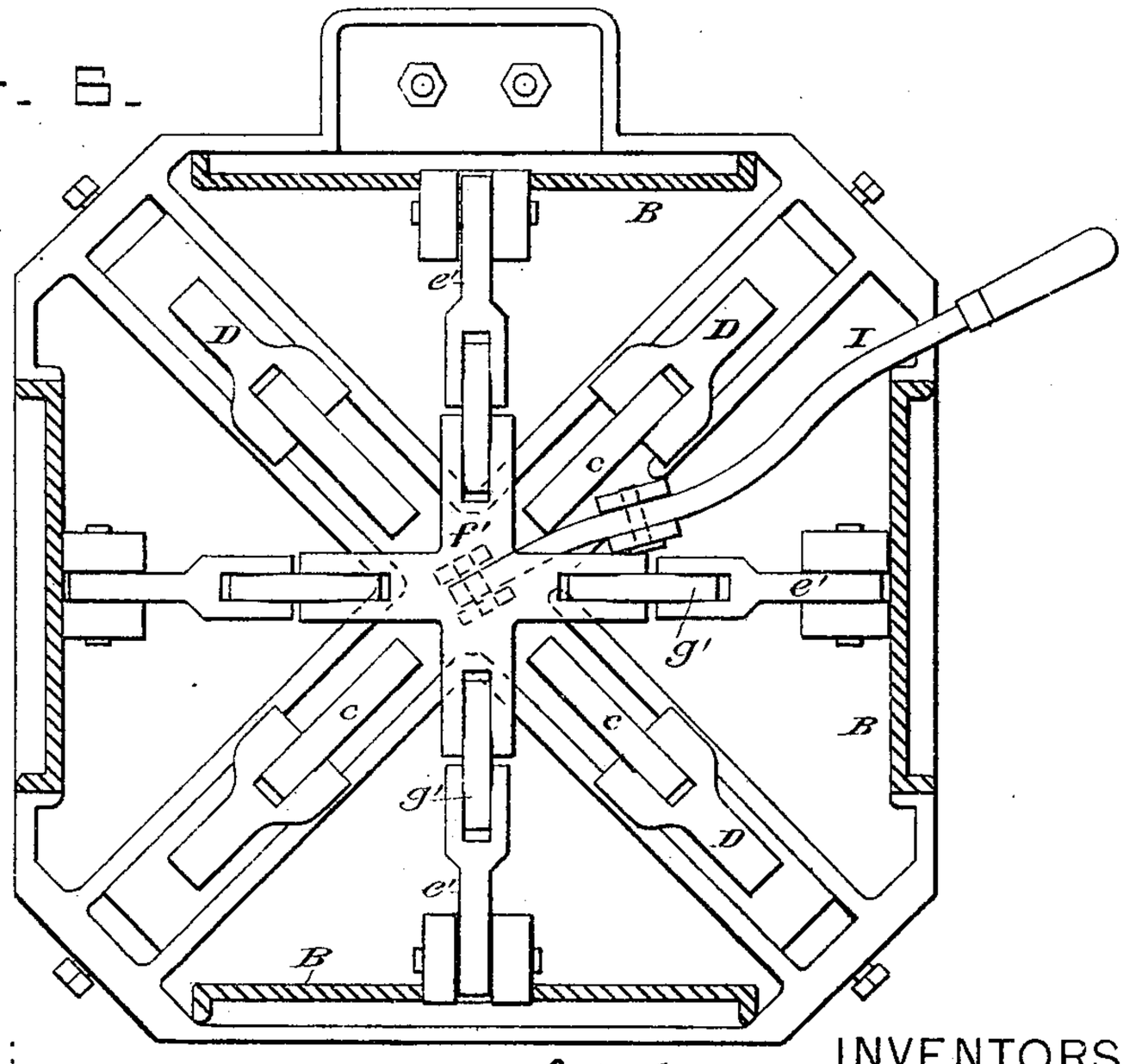


Fig. 6.



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UNITED STATES PATENT OFFICE.

THOMAS L. SMITH AND WILLIAM S. DOIG, OF BROOKLYN, N. Y., ASSIGNORS TO THE CENTRAL REFINING COMPANY, (LIMITED,) OF NEW YORK.

CAN-SEAMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 273,774, dated March 13, 1883.

Application filed January 16, 1883. (No model.)

To all whom it may concern:

Be it known that we, THOMAS L. SMITH and WILLIAM S. DOIG, both citizens of the United States, and residents of Brooklyn, Kings county, New York, have invented certain Improvements in Machines for Seaming Cans, of which the following is a specification.

Our invention relates to improvements on that class of machines employed for affixing the heads to square or polygonal sheet-metal cans. These machines serve to "squeeze" or seam down the upturned edge of the channel formed at the margin of the can-head upon the flared edge of the can-body. Such cans have a body which is in the nature of a square or rectangular tube, the angles or corners of which are quite rigid and stiff, while the sides are flexible and generally bulged out and irregular. Therefore some addition to the ordinary "squeezing" or seaming machine is needed to bring the body of the can into a regular square shape before it can properly enter the channel in the head, which latter lies in a socket or can-recess in the bed of the seaming-machine. Such machines have been provided with means for squaring up and guiding the edge of the can-body into the channel in the head; but, so far as we are aware, these have all been provided with jaws made to approach the can diagonally and to act upon the corners of the can rather than its sides. This tends to cause the sides to bulge or buckle at their middles and to form a crease at that point. In our improved machine we arrange the squaring-jaws to approach from the four sides, the jaws extending along the sides from corner to corner; and our present invention relates in part to this construction and arrangement of the squaring-jaws, in part to the means employed for operating these jaws, in part to means whereby the same movement of the treadle serves to first force the can-body down into the channel in the can-head, and then to set in motion the mechanism whereby the seaming is effected, and in part to the peculiar construction of the squeezing or seaming jaws, whereby the angles or corners may be adjusted to compensate for wear and renewed when worn out.

In the drawings which serve to illustrate our invention, Figure 1 is a side elevation of the machine. Fig. 2 is a plan of the same with the device for pressing down the can-body removed. Fig. 3 is a vertical section taken substantially on line 3 3 in Fig. 1. Fig. 4 is a view of the under side of the bed, being substantially a section on line 4 4 in Fig. 1. Figs. 5 and 6 are respectively a sectional elevation and plan or bottom view, designed to illustrate a modified form of the mechanism for actuating the squaring-jaws; and Fig. 7 is a view of the under side of the bed, designed to illustrate another modification of the mechanism for this purpose. Fig. 7^a is a detached view, being a section on line 7^a 7^a in Fig. 7. Figs. 8 and 9 are respectively a plan and sectional view on the line 9 9, Fig. 8, designed to illustrate the construction of the seaming-die.

Referring now to the first four figures of the drawings, which illustrate our invention in its most approved form, we will first proceed to briefly describe what is common in this class of can-seaming machines.

A is a stout frame, provided with a substantial bed, B. In the can-recess in this bed is set a square frame-like die-plate, *a*, to receive the can-head.

C C are the seaming-jaws, which play in ways formed on the bed B and in a plane drawn diagonally across the can. These jaws are provided with right-angled steel seaming-dies *b* at their edges, which serve to turn the flange on the can-head down upon the flared margin of the can-body, which is indicated by dotted lines in Fig. 1.

D D are the levers which actuate the jaws C, which levers are connected by links *c* with a nut or head, *d*, which is in turn connected by a link, *e*, with a lever, *f*. This lever is coupled by a connecting-rod, *g*, with a crank on a driving-shaft, *h*, which is driven from a pulley, E. One revolution of shaft *h* produces one alternate reciprocation of the seaming-dies *b*. The pulley E rotates loosely on the shaft *h*, and is caused to rotate the shaft by means of a clutch device, which on these machines, as ordinarily constructed, is actuated by a separate or independent lever.

F is a plate arranged over the center of the bed B and high enough for a can to stand un-

der it. This plate is coupled to the free end of an arm, *i*, which is coupled at its other end to a rod or bar, *j*, which rests upon a spring in a hollow standard, *k*, fixed to the bed of the machine. A rod, *l*, is coupled to the arm *i* and passes down through the machine-bed, where its lower end is coupled to a treadle, *m*. On the rod *l* is a spring, *n*, arranged to be compressed when the plate F is forced down by the depression of treadle *m*, and to retract the parts when the pressure is removed from the treadle. This device is employed to force the can-body down firmly into the recessed head and to hold it in that position while the seam is being turned down.

Having described the ordinary seaming-machine unprovided with means for squaring the can-body and guiding it into the channel in the head, we will now proceed to describe our improvements.

Referring particularly to Figs. 2 and 3, G G are what we will denominate "jaws," which are fitted with inclined face-plates *o*. There are four of these jaws arranged to embrace the four sides of the can-recess, and the face-plates form a sort of shallow guide-hopper. These jaws are adjustably mounted on slides *p*, Fig. 3, which play in undercut recesses in the bed B. The lower edges of the plates *o* stand just above the upturned flange of the can-head when the latter is in place, and are capable of being moved inward, so as to overhang the said flange all around, so that when the can is forced down its lower end will be squared and will be compelled to enter the channel in the head. When the seam is formed (by the mechanism before described) the jaws G and the plates *o*, attached thereto, are withdrawn far enough to permit the can to be lifted out. The movement of the jaws G need not be great, one-fourth of an inch being sufficient in all ordinary cases. The jaws G acting upon the sides of the can and the squeezer-jaws C upon the corners, it will be seen that we are enabled to arrange the slides *p* in the same horizontal plane as the jaws C, and thus avoid mounting the squaring-jaws over the squeezer-jaws, as is done in some machines for this purpose.

We will now describe the means which we prefer to employ for actuating the squaring-jaws G and their appurtenances.

Referring to Figs. 3 and 4, H is a four-armed spider, which is mounted rotatively on a stud or bolt, *q*, arranged in the center of the under side of the bed B. To the ends of the arms of this spider are coupled, by links *r*, the one ends of four levers, *s*, pivoted to the bed B. The other ends of said levers are provided with elongated perforations, and pins or studs *t*, pendent from the slides *p*, extend down through these perforations, as shown. The spider is provided with a lever-like handle, I, whereby the said spider is turned on its axis, and a slight rotary movement in the direction of the arrow in Fig. 4 acts, through the links *r* and levers *s*, to move all the jaws G in toward the can-recess simultaneously. When the lever is released the parts are retracted by a suitable spring, *u*. (Shown in Fig. 4.) The retracting-spring may be arranged in various ways—as, for example, the slides *p* may each be provided with a retracting-spring arranged in a socket in the bed B.

We will now describe the means whereby the can-body is depressed and the mechanism for seaming set in motion consecutively and at one operation of the treadle *m*.

J is the clutch device, whereby the pulley E is temporarily connected to the shaft *h*, so that both may rotate together. This clutch is a well-known device, and need not be herein minutely described. Indeed, almost any one of the well-known clutch devices may serve our purpose. We will say, however, that our clutch is so constructed that the shaft will make but one revolution when the clutch is uncoupled automatically, and remains so until again put in action. Extending around the front of the machine is a lever, K, (see Figs. 1 and 2,) which is pivoted to the bed B at *v*. At the front of the machine a rod, *w*, is coupled to this lever, and extends down to the treadle *m*, which passes through a slot or fork at *w'* in the lower end of said rod *w*. To the short end of lever K, at the right side of the machine, is attached a rod, *x*, which extends down and is coupled to a short crank, *y*, on the end of a rock-shaft, *z*, which oscillates in bearings on the side of the main frame A. On the other or forward end of the shaft *z* is an arm, *a'*, which is arranged under the shaft *h*, which bears the clutch.

Now, when the can-head has been placed in the central recess of the bed B the attendant presses back the lever or handle I, which throws in the jaws G until the inclined face-plates *o* overhang or stand just over the upturned marginal flanges of the can-head. The can-body is now set in place in the hopper formed by plates *o* and forced down into the channel in the head by pressing down the treadle *m*. The first effect of this downward pressure is to depress the can-body; but near the termination of its stroke the treadle engages the bottom of the slot at *w'* in rod *w*, and serves to swing the arm *a'* on shaft *z* to an inclined position out from under the clutch, through the medium of lever K, rod *x*, and crank *y*. This serves to permit the clutch J to act and couple the pulley E, which is constantly revolving, to the shaft *h*, and, through the means before described, to seam the can. As soon as the treadle *m* is depressed and the can-body seated in the channeled head, the lever I is released, and spring *u* retracts the jaws G, and when the treadle *m* is released the spring *n* retracts the plate F and its accessories, and a spring, *b'*, attached to the short arm of lever K, retracts the said lever and its accessories, notably swinging the arm *a'* again into the path of the clutch J, whereby when the shaft

has completed its revolution the arm *a'* will act upon the clutch in a manner to disconnect the pulley from the shaft and stop the rotation of the latter. Thus, the same depression of the treadle *m* serves to first depress the can-body and then set in motion the seaming mechanism, the two movements being almost simultaneous. In machines of this character heretofore these two movements were effected by separate levers or treadles. In order that the treadle *m* may be a little farther depressed after the can has been forced down as far as it will go, so that the seaming mechanism may be set in motion thereby, the rod J is given a spring or yielding support in the standard *k*. Thus, after the plate F can descend no farther, the rod *l* may descend a little more, whereby a terminal movement in excess is permitted to the treadle *m*.

In Figs. 8 and 9 we have shown our improvements in the construction of the seaming jaws and dies. Heretofore, so far as we are aware, each of these angular dies has been made in one piece and secured to the jaw, and, owing to the extra pressure required to seam down the flange at the corners, as compared with the flat sides, we find the dies wear off rapidly at the re-entering angle, thus necessitating the renewal of the entire die, which is quite expensive, being made from carefully-tempered steel. We obviate this by making this portion *c'* of the die *b* separate and removable, and arrange it to fit in a recess in the jaw C, as best shown in Figs. 8 and 9. The angle-die *c'* is slotted to receive the attaching-screw *d'*, and is arranged to be adjusted in its bearing or socket, so that when worn away it may be set out flush with the remainder of the die, or when worn out replaced by a new one. To prevent it from being driven back by the pressure brought upon it in seaming the can, thin slips of metal may be placed in the socket or recess behind it, as shown.

Referring now to Figs. 5 and 6, we will describe the construction of the modification illustrated therein, which is another mechanism for moving in the jaws G. This mechanism is substantially the same as that employed for operating the squeezer-jaws C—that is to say, four levers, *e'*, are mounted on fulcrum-pivots in the bed B, and their upper ends are arranged to engage slots or mortises in the slides *p*. The lower ends of these levers are coupled to a nut or hub, *f'*, by links *g'*. The operating lever or handle I is coupled at one end to the nut *f'*, and is pivoted or fulcrumed to the bed B. By lifting the projecting end of the lever I the jaws G are moved in. The spring *u* serves to retract them, as will be well understood. By reason of our arrangement of the jaws G to move up at the sides of the can-recess and the jaws C at the corners it will be seen that we are enabled to arrange the levers *e'* between the levers D, as represented in Fig. 6.

Referring now to Figs. 7 and 7ª, we will describe another modification by which the same result may be effected. In Fig. 7 we have omitted all extraneous mechanism, it being understood that such mechanism as we have not shown is the same as that before described.

L L are four shafts, arranged to extend along the four sides of the bed B and under the edge of same. These are rotatively mounted in bearings on the bed, and are provided at their ends with intermeshing segment miter-gears *h'*, whereby when one shaft L is rocked all the shafts will be rocked—that is to say, partially rotated in their bearings. A complete rotation is not necessary, and therefore we employ mutilated or segment gears in lieu of full gears. One of these shafts is prolonged, and bears an operating crank or lever, I. On each shaft L, at the point where it passes under the slide *p* on that side, is provided an arm, *i'*, which extends up through the table-bed and engages a recess or aperture in the said slide. This construction is best shown in Fig. 7ª. When the shafts are turned inward by means of the lever or crank I the jaws G are moved inward, as will be well understood, through the medium of the arms *i'*.

In Fig. 5 we have omitted the front part of the frame A and part of the lever *e'* and link *g'* at the front, in order to avoid obscuring the parts behind them, and we have broken away a part of bed B to show the connection of lever *e'* with the jaw G. In Fig. 6 we have omitted the nut or head *d* in order to show the nut *f'*, which is above it.

In Fig. 1 we have shown a spring, *j'*, attached at its lower end to lever *f* and at its upper end to the table-bed B. This spring serves to balance the weight of the parts and to assist in the retraction of the seaming or squeezing jaws. It may or may not be employed.

In Figs. 3, 4, and 5, *k'* represents a part of the main frame, which provides one bearing for shaft *h*. This is not shown in full, as it would obscure the operative parts. The treadle *m* is pivoted at the rear of the machine, between jaws *l'*, (see Fig. 3,) fixed to the frame. These are indicated by dotted lines in Fig. 1.

Our machine is susceptible of some variation without materially departing from the invention—as, for example, the face-plates *o*, which are of steel, are only employed for the sake of economy and convenience. The faces of the jaws G might be constructed to serve in lieu of said plates. The retracting-spring *u* might also be dispensed with; but in that case the jaws G would have to be retracted by the attendant by a reverse movement of handle I. The studs *t* might also be attached to the levers *s*, and be made to engage cross-slots in the slides *p*. If another kind of clutch be employed than that shown, the device for operating it, comprising the shaft *z* and its crank *y* and arm *a'*, would be modified accordingly.

It will be seen that the plane in which the

jaw C moves or travels is at an angle of forty-five degrees with the plane in which the adjacent jaws G move, and this will always be the case whether the cans be square or in some other rectangular form.

In the construction shown the upper end of the stud *t* serves as a bolt to secure the jaw G to the slide *p*, which is an economical arrangement, but one not absolutely necessary.

Having thus described our invention, we claim—

1. A can-seaming machine provided with seaming-jaws C, arranged to approach the can diagonally in forming the seams, and with squaring-jaws G, mounted to slide in guides in the bed B in the same horizontal plane with the jaws C, and said jaws G arranged to move in planes at an angle of forty-five degrees with the planes of the seaming-jaws, as shown, all arranged to operate substantially as and for the purposes set forth.

2. The combination, with the table of the frame of the machine, the seaming-jaws, and the mechanism for actuating said jaws, all constructed substantially as shown, of the squaring-jaws G, mounted on the table between the seaming-jaws, and arranged to move in guides toward and from the sides of the can-recess in the table, and the mechanism, substantially as described and shown, for actuating the said squaring-jaws, all arranged to operate substantially as set forth.

3. The combination, with the seaming mechanism, constructed and arranged substantially as shown, of the squaring-jaws G, mounted on the slides *p*, and arranged to move toward and from the sides of the can-recess, the spider H, links *r*, levers *s*, handle I, and studs *t* on the slides *p*, all arranged to operate substantially as set forth.

4. The combination, with the seaming or squeezing mechanism, constructed as shown, the crank-shaft *h*, clutch J, and pulley E, of the plate F and its support, the rod *l*, spring *n*, treadle *m*, lever K, rods *w* and *x*, and shaft *z*, provided with the crank *y* and arm *a'*, all constructed and arranged substantially as shown, whereby the same operation of the treadle that forces the can down into its head serves to set in motion the seaming mechanism, all arranged substantially as set forth.

5. The seaming-jaw C, provided with an angular seaming-die, *b*, which has a removable and adjustable portion, *c'*, substantially as and for the purposes set forth.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

THOS. L. SMITH.
WILLIAM S. DOIG.

Witnesses:
GEO. W. PAYNTAR,
J. W. FRASER.