

No. 673,720.

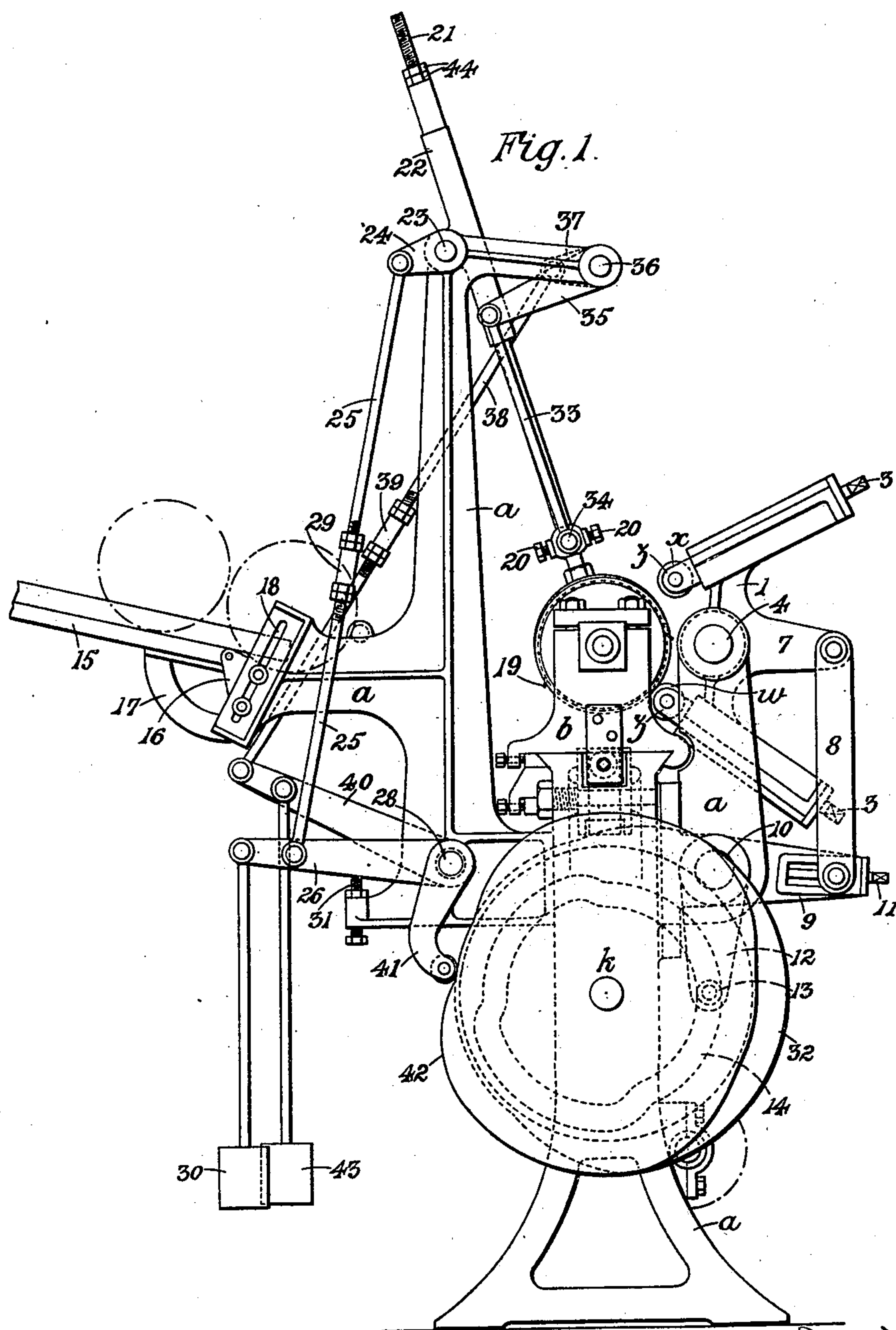
Patented May 7, 1901.

C. F. MENDHAM, E. F. GRIFFIN & W. E. HIGGS.
CAN SEAMING OR LIKE MACHINE.

(Application filed Mar. 26, 1900.)

5 Sheets—Sheet 1.

(No Model.)



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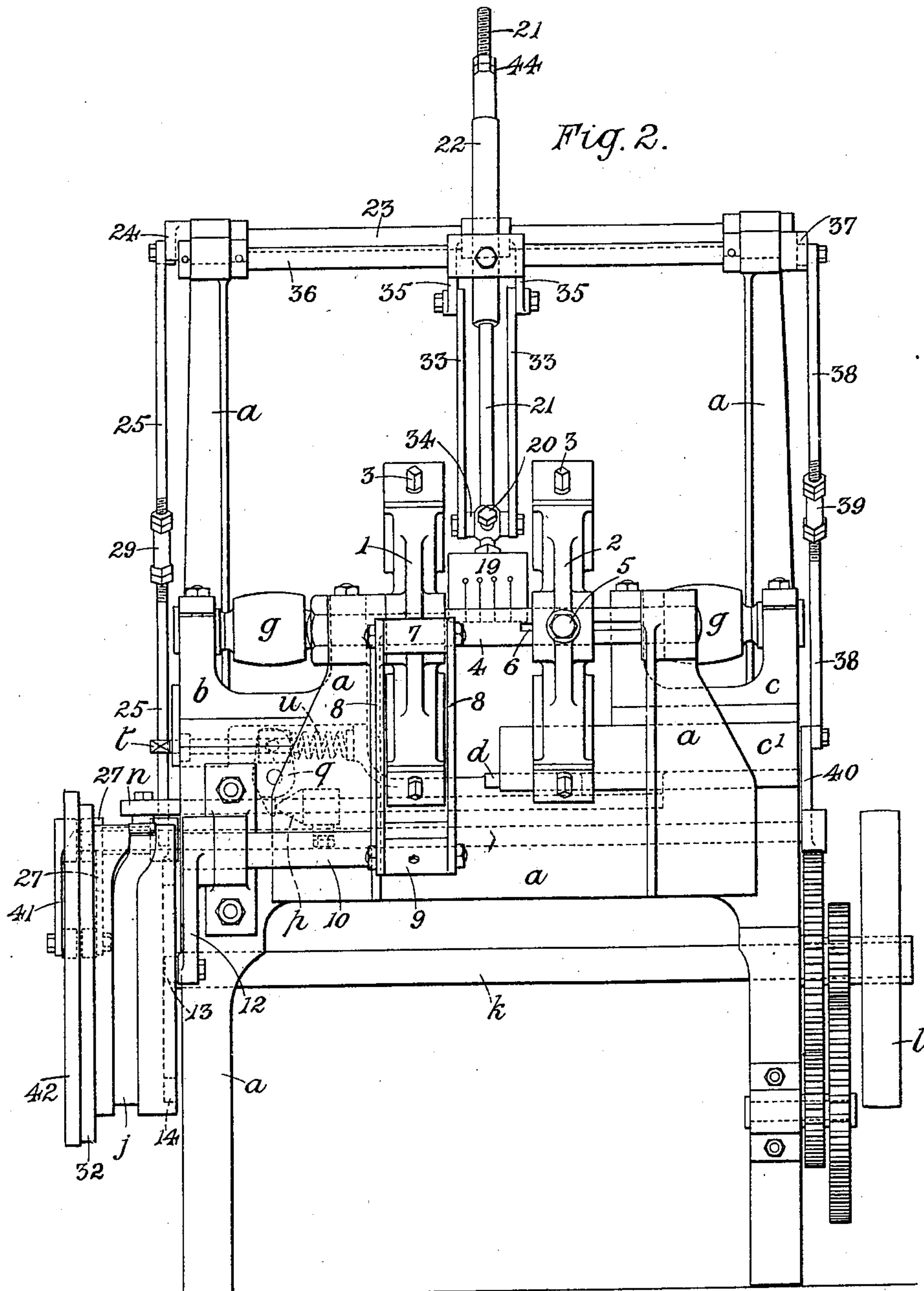
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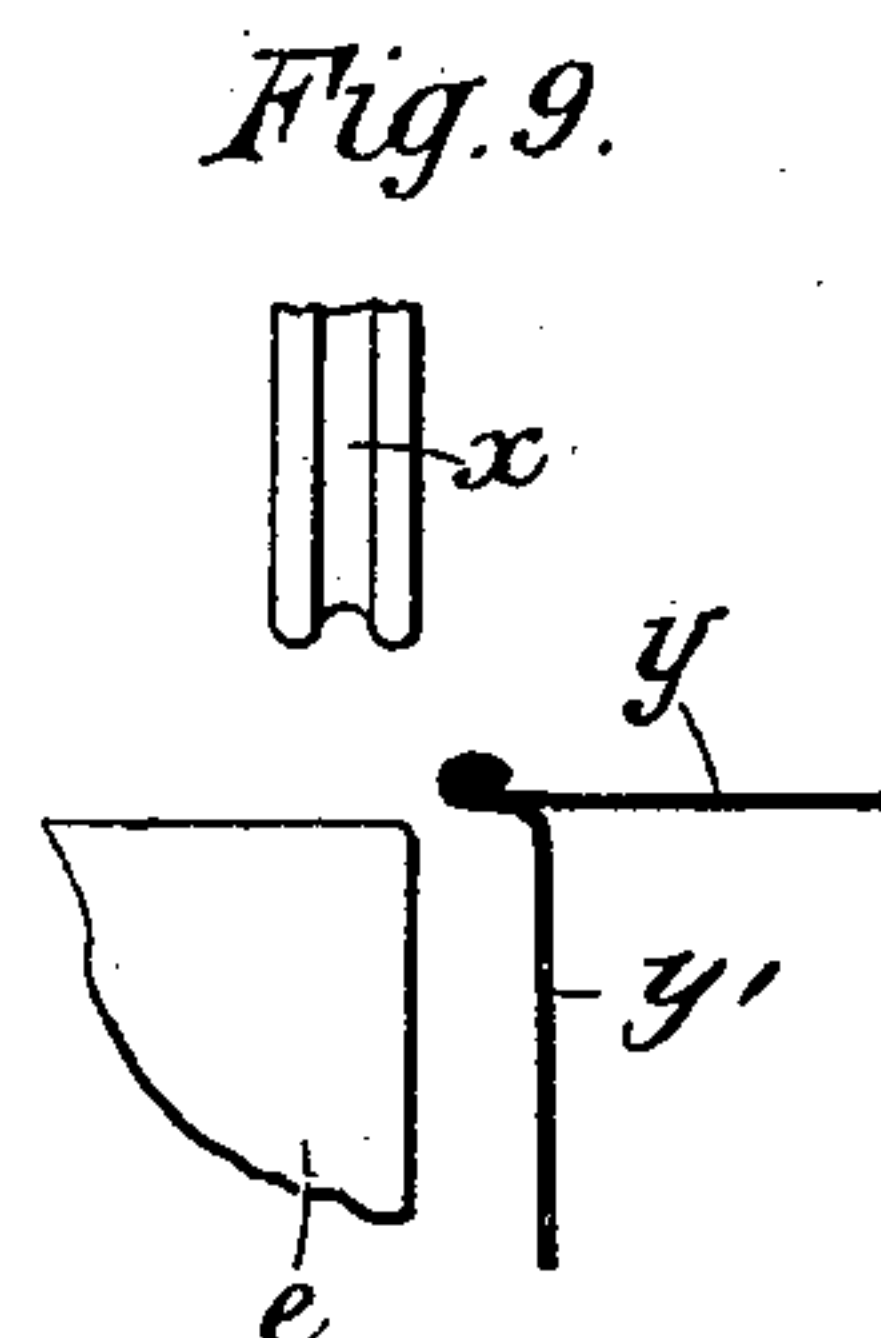
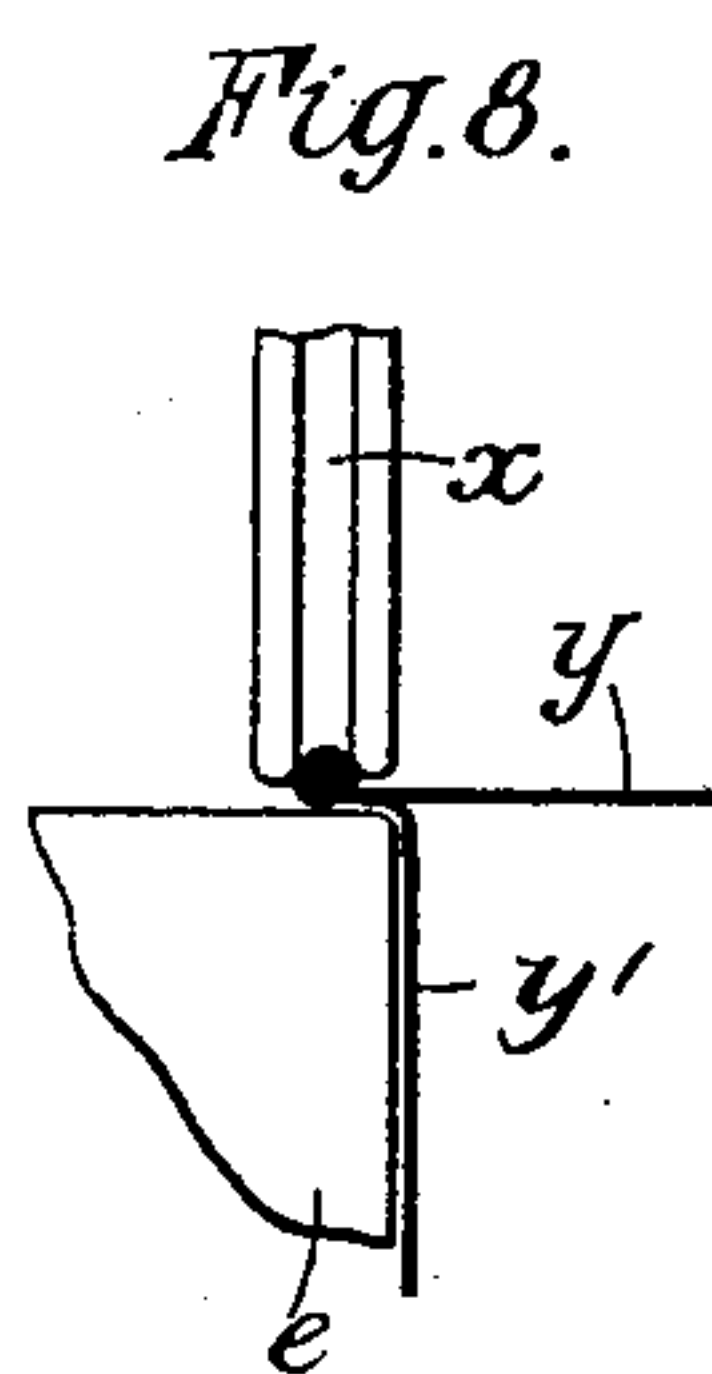
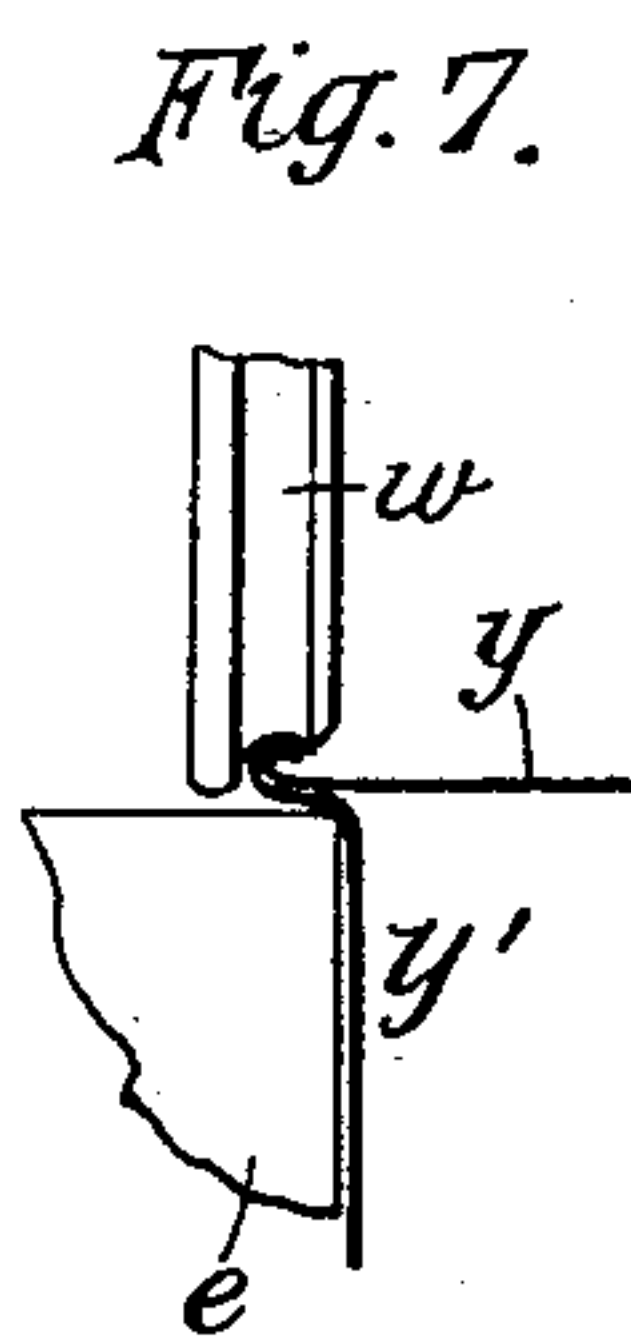
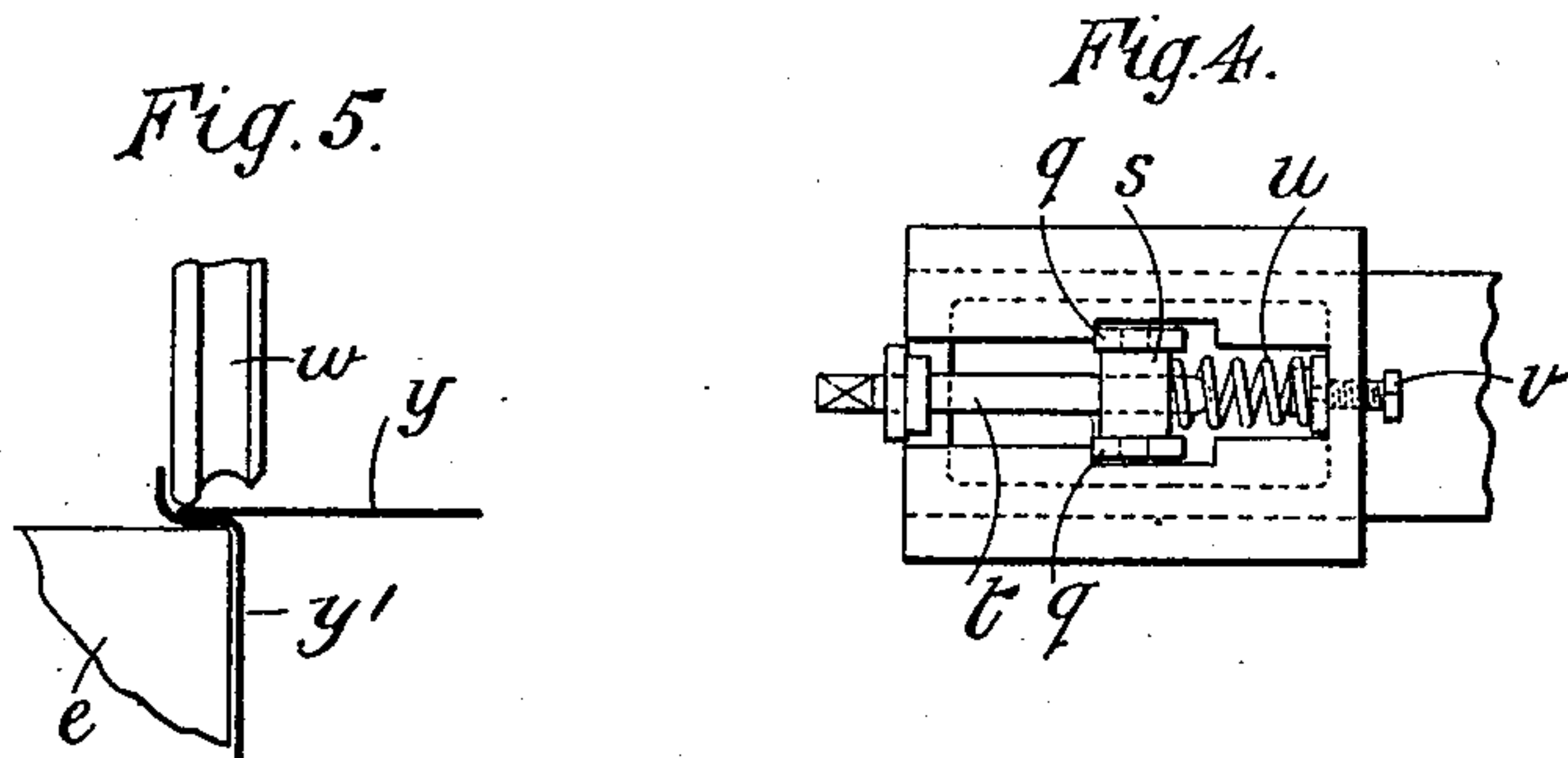
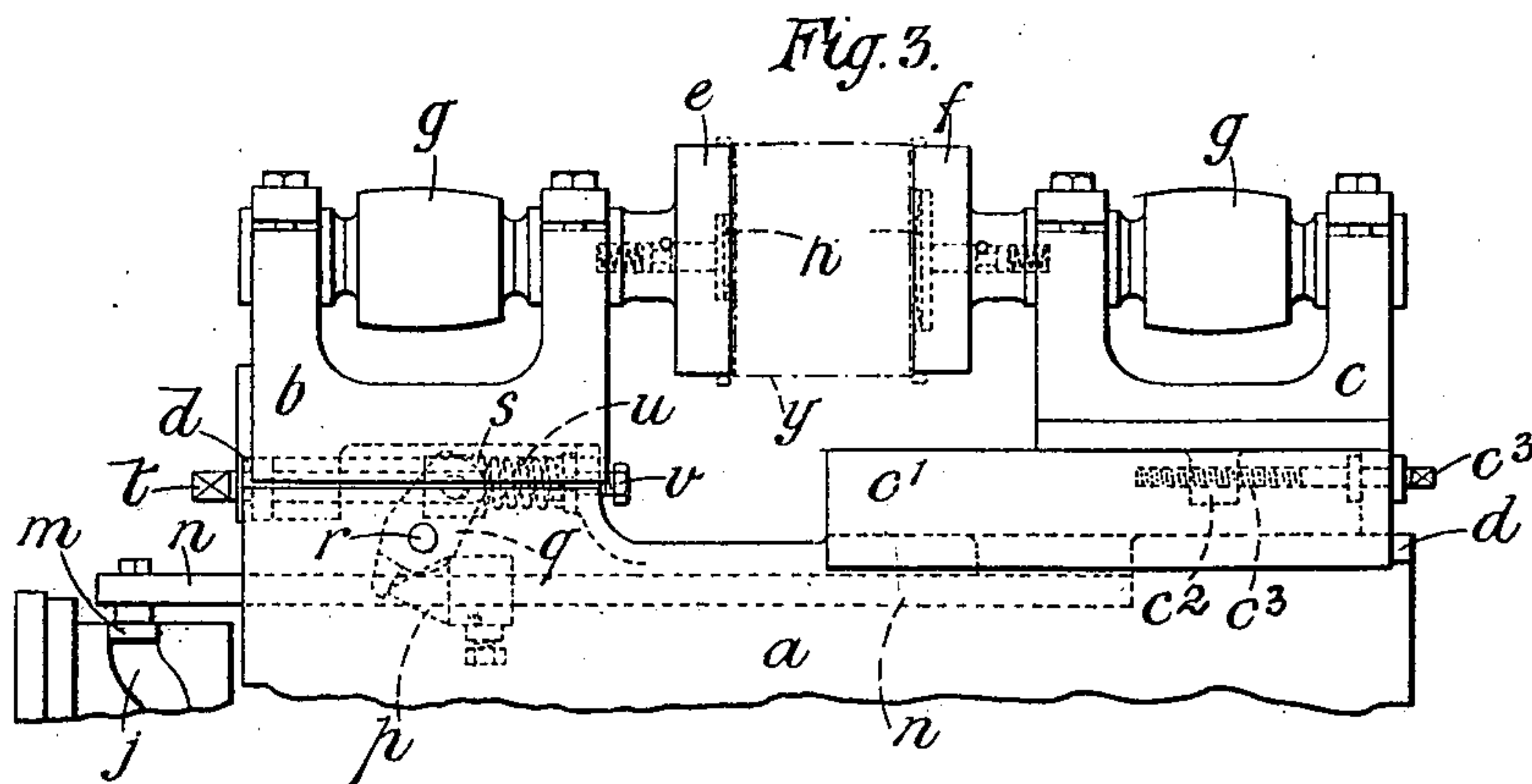
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5 Sheets—Sheet 3.



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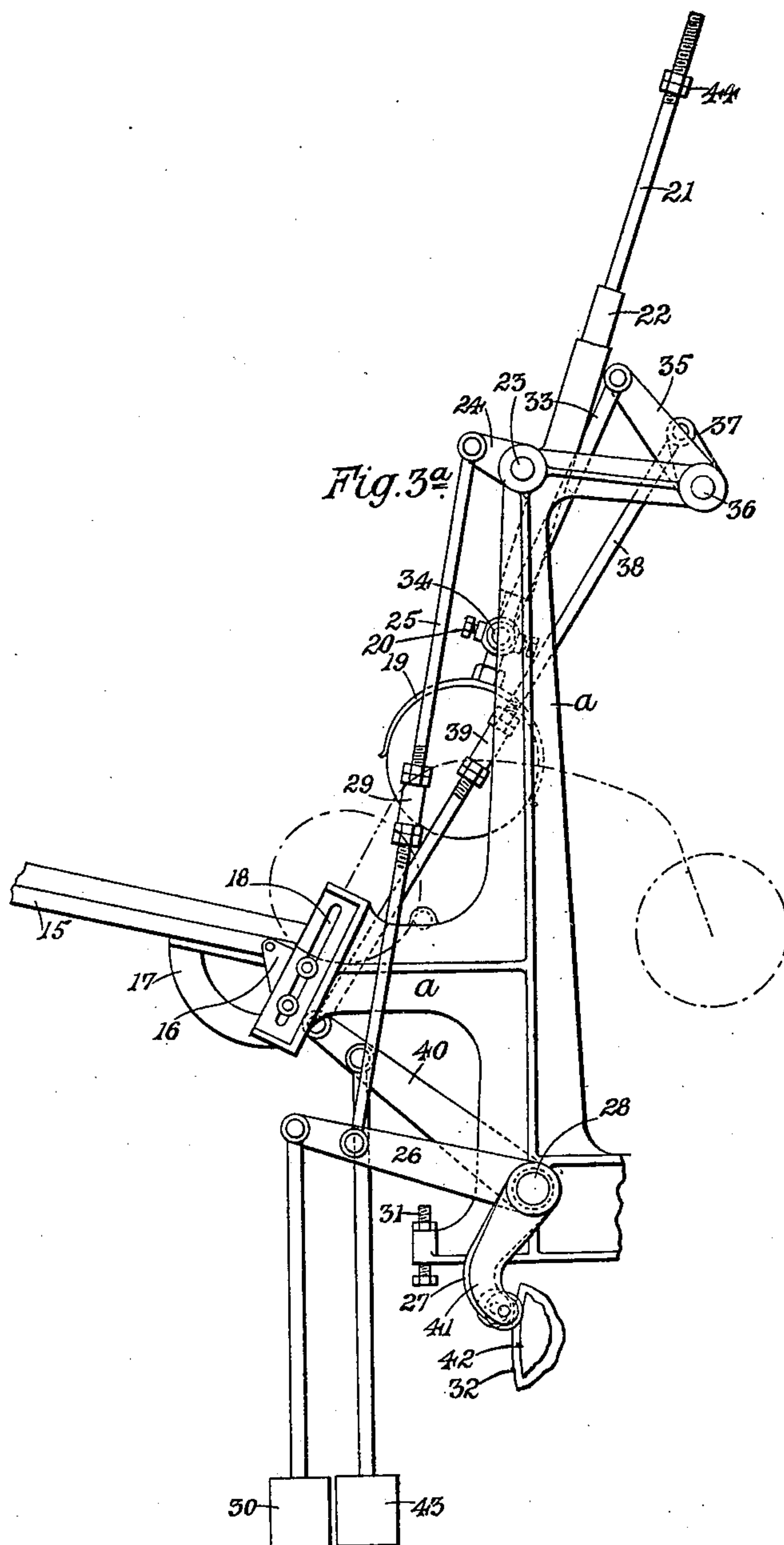
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5 Sheets—Sheet 4.



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5 Sheets—Sheet 5.

Fig. 6.

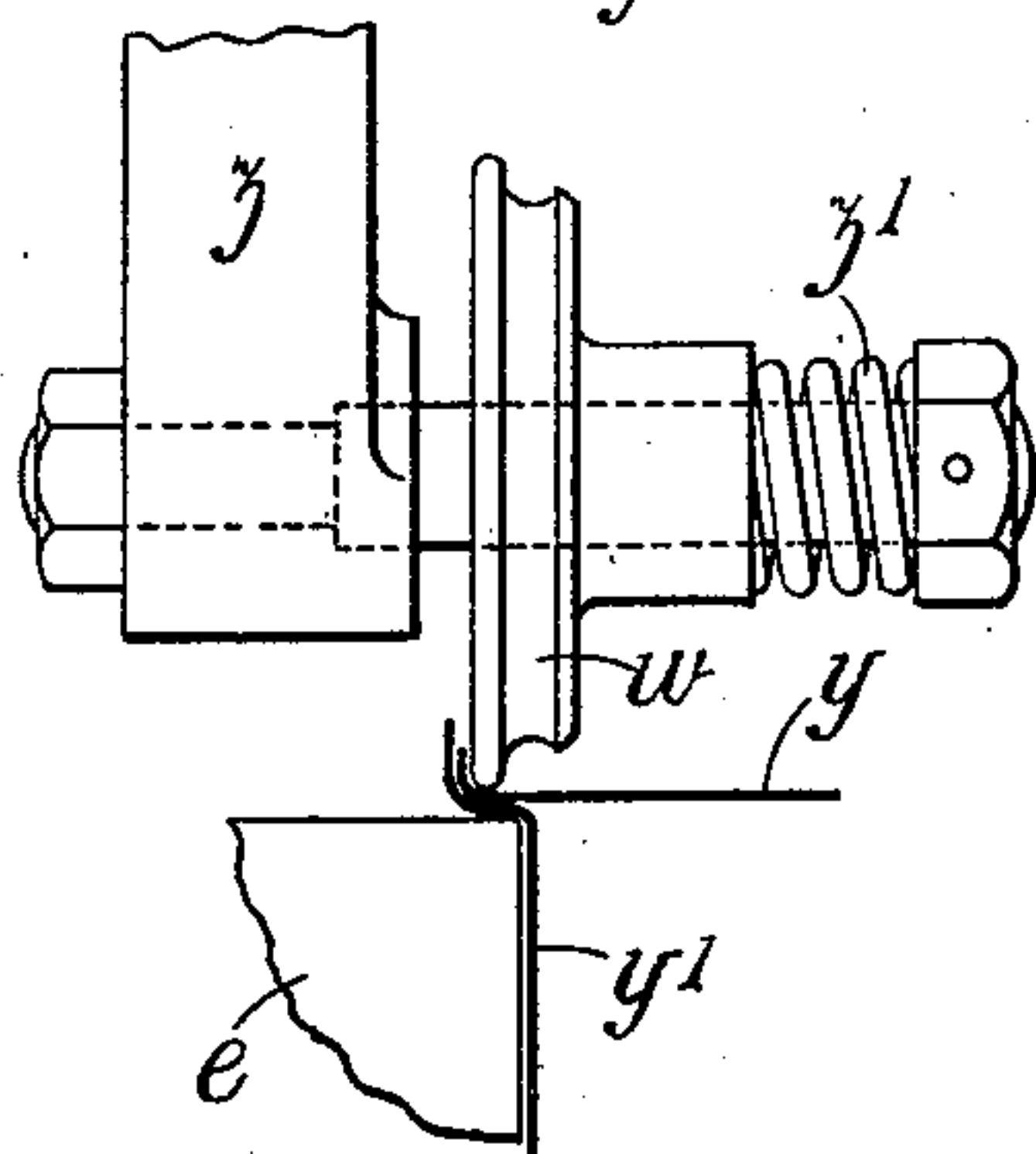
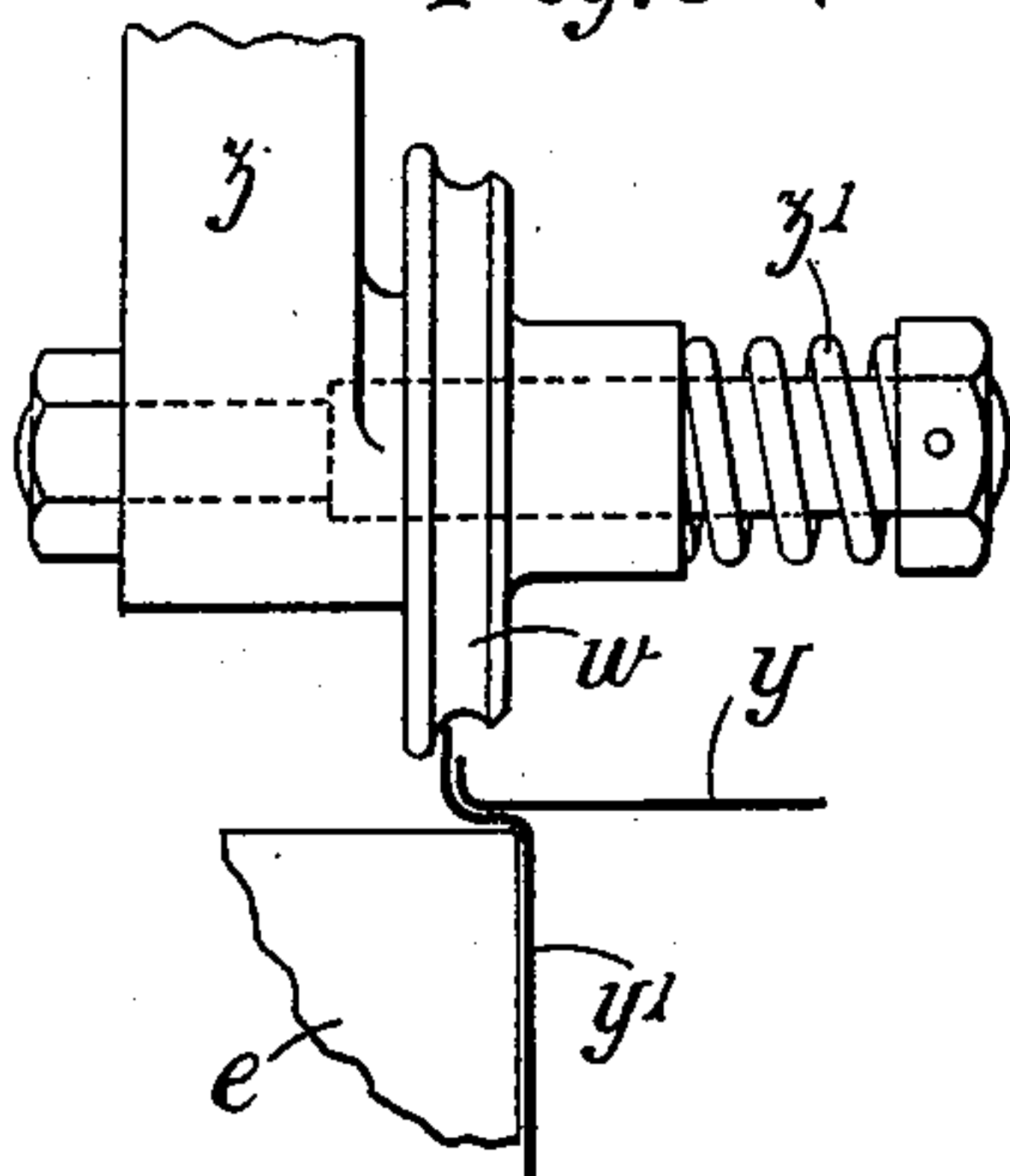


Fig. 6^a.



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UNITED STATES PATENT OFFICE.

CONRAD FIELD MENDHAM, ERNEST FEATHERSTONE GRIFFIN, AND WALTER EDWARD HIGGS, OF LONDON, ENGLAND.

CAN-SEAMING OR LIKE MACHINE.

SPECIFICATION forming part of Letters Patent No. 673,720, dated May 7, 1901.

Application filed March 26, 1900 Serial No. 10,253. (No model.)

To all whom it may concern:

Be it known that we, CONRAD FIELD MENDHAM, ERNEST FEATHERSTONE GRIFFIN, and WALTER EDWARD HIGGS, subjects of the Queen of Great Britain, residing at London, England, have invented certain new and useful Improvements in and Relating to Can-Seaming or Like Machines, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation, Fig. 2 a rear elevation, and Fig. 3 a rear elevation with parts removed, of our improved can-seaming machine. Fig. 3^a is a partial side elevation illustrating the operation of our improved machine. Fig. 4 is a plan illustrating a detail of construction. Figs. 5, 6, 6^a, 7, 8, and 9 are diagrams illustrating the successive stages in the formation of a joint or seam.

Like characters indicate corresponding parts throughout the drawings.

Our invention relates to can-seaming and like machines, and is chiefly designed to enable such machines to act automatically and rapidly, so as to permit a large output, while obviating any risk of danger to the attendants.

An important feature of our said invention consists in that the bodies of the sheet-metal boxes or cans are flanged up, the ends pressed on, and the joints double-seamed all in one operation. For this purpose the cylindrical can-body, with the ends loosely placed in position thereon, is received between two suitably-formed and fast-rotating chucks. As the tin revolves between the said chucks suitably-formed spinning wheels are moved automatically into contact with the body and operate in such a manner as to throw up the necessary flanges. The process is further accelerated by the rotating chucks closing up together by an amount equal to the depth of the flanges at the precise moment the flanges themselves commence to form. The flanges being thus made, the spinning wheels continue to advance and by this action slightly curl the edges of the ends of the tins. This done the wheels withdraw, and two others, also specially shaped, come into play and continue the spinning action where the former ones left off till the ends and the flanges on

the body are curled up together, forming what is known as a "double-seam" joint. These latter wheels now retire, and the chucks slide apart, releasing the tin, ready for the next. The rotation of the tin by means of the said chucks is quite distinct from the operation of flanging and curling. The two chucks are driven by independent belts, the speed varying according to the diameter of the tins it is required to make.

According to another part of our invention we provide improved means whereby can-bodies, drums, or the like can be automatically and rapidly transferred from one place to another—for example, from an inclined chute or way, onto which they are placed by hand, into position between the rotating chucks above mentioned—or they can be employed for analogous purposes in can-working machinery. For this purpose the apparatus consists chiefly of a hanging arm which by an arrangement of shafts, cranks, and cams receives two principal movements—viz., a swinging or pendulum motion from one cam and a vertical reciprocating action from the other. By a suitable combination of these motions the lower end of the arm, which is provided with a suitable hand for grasping the tin, can be made to pick up the boxes from some convenient source of supply and rapidly deliver them into the seaming or other machine. To further insure positive action—i. e., that each tin shall be delivered to exactly the same position—the cam-rollers are brought to rest on special adjustable stops when the tin is in the position to be grasped by the machine. It is further carried out in the design that in the event of the machine refusing to discharge the finished tin at the proper moment this apparatus cannot become deranged by the tins colliding. The rollers on the cam-paths above referred to are held down by hanging weights, which in the event of any undue resistance to the arm either in swinging, lifting, or lowering are simply raised up, as hereinafter described. This is a feature of special safety.

The apparatus is adjustable throughout and may be made to handle any size tins or drums. It can further be used in either vertical or horizontal positions. Our said in-

vention, moreover, comprises other improvements hereinafter set forth.

Referring to the drawings, *a* is the frame of the machine.

5 *b c* are head-stocks adapted to slide on guide-ways *d* on the frame *a* and bearing chucks *e f* on their mandrels, which are driven by means of belt-pulleys *g*. The chucks *e f* are of suitable form to engage with the ends of
10 the cans to be made and are provided with spring-controlled presser-pads *h* in their end faces for automatically freeing the finished cans from the said chucks when the head-stocks are moved outward, as hereinafter de-
15 scribed.

The inward motion of the head-stocks *b c* to engage the can and the outward motion there-
of to release the said can are obtained by means of a cam-groove *j*, formed in a drum
20 on the main shaft *k*, to which rotary motion is imparted by means of spur-wheel reduction-gearing from the driving-pulley *l*. In the cam-groove *j* works a roller *m*, mounted at one end of a sliding bar *n*, the other end
25 of the said bar being secured to the lower part *c'* of the head-stock *c*, which is adjustably secured to the upper part *c* by means of a nut *c'* and leading-screw *c'*. The bar *n* is, moreover, provided with a sleeve, which is
30 adjustably secured thereto by means of a set-screw or other suitable means and bears a knife-edged projection *p*. This projection *p* is adapted to engage with the lower arm of a
35 double-armed lever *q*, pivoted at *r* in the frame *a* and having its upper end pivotally connected to a block *s*, which is adjustably secured to the head-stock *b* by means of a
40 leading-screw *t*. When the bar *n* is moved to the left, Figs. 2 and 3, the head-stock *c* will be carried with it, and at the same time the head-stock *b* will be moved to the right by means of the lever *q*, thus bringing the chucks
45 *e f* together. The chuck *f* is moved outward again by means of the bar *n*, and the chuck *e* by means of a spring *u*, resting at one end against an adjustable stop *v* on the frame *a* and at the other against the block *s*.

The spinning rollers *w x* for acting on the ends of the can *y* are rotatably mounted on
50 carriages *z*, which are adapted to slide on brackets or frames 1 2 and are adjustable thereon by means of nuts and leading-screws 3. The brackets 1 2 are mounted on a rock-shaft 4, which is supported in suitable bear-
55 ings on the frame *a*, the bracket 2 being adjustable longitudinally along the shaft 4, for which purpose it is secured thereto by means of a set-screw 5, engaging with a slot or groove 6 in the said shaft.

60 In order to bring one or other set *w x* of spinning rollers into engagement with the can or to hold both sets out of engagement therewith, as required, the bracket 1 is provided with an arm 7, which is connected by
65 links 8 to an arm 9 on a second rock-shaft 10 in such a manner that the distance between the axis of the shaft 10 and the axis of the

joint between the links 8 and arm 9 can be adjusted by means of a nut and leading-screw 11. The rock-shaft 10 is actuated by
70 means of an arm 12, which bears a roller 13, engaging with a cam-groove 14 in the inner side of the drum on the main shaft *k*. By adjusting the head-stocks *b c*, the bracket 2, the
75 carriages *z*, and the link 8 as above described the machine can be arranged to work on cans of any desired length and diameter within given limits.

15 is an inclined chute onto which the can-bodies with the ends loosely fitted therein
80 are placed and to the bottom of which they successively roll by the action of gravity. This chute is pivotally mounted on brackets 16 and can be secured at any desired inclina-
85 tion by means of set-screws or other clamping devices acting upon quadrants 17. The height of the brackets 16, and therefore also of the lower end of the chute 15, can be ad-
90 justed by raising and lowering the studs supporting the brackets 16 in the slots 18 in the frame *a*.

In order to transfer the can-bodies *y* from the lower end of the chute 15 into position between the chucks *e f*, we employ our im-
95 proved feeding or transferring device, which comprises a spring clip or hand 19, formed of elastic sheet metal of suitable width of ap-
erture and diameter to readily slip or spring over and retain the can-bodies *y* to be worked. This hand 19 is detachably secured, by means
100 of a set-screw 20, to a rod 21, which is adapted to slide longitudinally in a sleeve 22, mounted on a rock-shaft 23. The upper end of the sleeve 22 is of smaller diameter than the re-
105 maining portion and is adapted to be engaged by the stop-nuts hereinafter described. The shaft 23 is provided with an arm 24, connected, by means of a link 25, to one arm 26 of a bell-
110 crank lever 26 27, which is capable of turning freely on the shaft 28, the link 25 being made in two parts connected by a turnbuckle 29, so as to permit adjustment of the limiting positions of the sleeve 22. The arm
115 26 is drawn downward by means of a weight 30, pivotally connected thereto, its lowermost position being determined by means of an adjustable stop 31. The upward motion of the arm 26 is effected by means of a cam
120 32 on the cam-drum acting on a roller at the end of the arm 27 of the said lever. By these means the sleeve 22 will be oscillated between the extreme positions indicated in dotted lines in Fig. 3^a.

The motion of the rod 21 in the sleeve 22 is effected by means of links 33, pivotally
125 connected to a cross-head 34 at the lower end of the said rod and to arms 35, mounted on a rock-shaft 36. The shaft 36 is actuated by means of an arm 37 and a link 38, provided with a turnbuckle 39 for adjusting the limit-
130 ing positions of the hand 19, from an arm 40 on the shaft 28, which shaft is itself controlled by an arm 41, having a roller at its end for engaging with a cam 42 on the cam-

drum, and by a weight 43, pivotally attached to the arm 40. A further adjustment for limiting the downward travel of the hand 19 is provided by a stop consisting of lock-nuts 5 44, secured on the screw-threaded upper end of the rod 21 and adapted to engage with the upper end of the sleeve 22 when the hand 19 is in its lowermost position.

The operation of our improved machine is as follows: Assuming the roller *m* to be in the part of the cam-groove *j* at which the chucks are moved to their farthest distance apart, as shown in Fig. 2, the hand 19 in the position shown in Fig. 1, and the chucks *e f* 15 to be rapidly rotating at equal velocities, the head-stocks *b c* are first moved together, so as to firmly grip the can between the chucks *e f*, and the hand 19 withdrawn by raising the rod 21 in its sleeve 22. The spinning wheels *w* 20 are then brought into engagement with the ends of the can, as shown in Figs. 5 and 6, to form flanges on the body thereof, the chucks *e f* being simultaneously moved further together to facilitate the formation of said 25 flanges. The frames 1 2 are then oscillated, so as to bring the spinning wheels *w* out of engagement and the spinning wheels *x* into engagement with the said can. The operation of forming the joint is effected as follows: The parts being in the position shown in Fig. 5, 30 the spinning wheels *w* are caused to act on the periphery of the cylindrical body *y* of the box or can near the edge thereof, while the chucks *e f*, Fig. 3, with the flanged heads *y'*, 35 are simultaneously brought together by the means above described, so as to curl over the end of the can-body *y*, as shown in Fig. 6, the wheels *w* meanwhile sliding longitudinally on their axes against the pressure of suitable 40 springs *z'*. The brackets 1 and 2 then rise sufficiently high to allow the wheels *w* to clear the flanges on the bottom and top of the can, and the springs *z'* return the wheels *w* to their former position against the slides *z* of the 45 brackets 1 and 2. Having accomplished this, the cam-groove 14 causes the brackets 1 and 2 to again descend and the wheels *w* to engage the edge of the flange on the top and bottom of the can, as illustrated in Figs. 6^a and 50 7. The brackets 1 2 are then rocked, so as to remove the wheels *w* from contact with the seam and to bring the spinning wheels *x* into engagement therewith, as shown in Fig. 8, so as to complete the joint, after which the wheels 55 *x* are withdrawn, as shown in Fig. 9, and the can ejected by the presser-pads *h* after separation of the chucks *e f*. The hand 19 is again raised, as shown in Fig. 3^a, and the sleeve oscillated until it approaches the position shown in Fig. 1, when the hand 19 descends and places 60 the fresh can in position between the chucks *e f*, which have in the meantime moved apart to release the finished can, the frames 1 2 being simultaneously moved into their mid-position, where the spinning wheels *w x* are at 65 equal distances from the axis of the chucks *e f*, Fig. 9. The said chucks now move in-

ward to seize the fresh can, and the spinning wheels *w* move into engagement with the said can, after which the above-described operations are repeated as often as desired. The chute 15 is kept supplied with unseamed cans, while the finished cans fall into a chute or other suitable transferring device, whereby they are conveyed into any desired position. 75

It will thus be seen that the machine works quite automatically and the attendant runs no risk of personal damage in supplying the cans to or removing them therefrom. Moreover, by arranging the levers 26 40 so as to 80 be brought to rest by adjustable stops 31 44 when the hand 19 is in its delivery position to hold an unseamed can between the chucks *e f* we are enabled to insure that the tin, can, or the like shall always register accurately 85 with the said chucks.

Another advantage of our improved machine consists in that there is no risk of damage being caused to the machine or to the cans in the event of any jamming taking 90 place, since the positive motions of the hand 19—i. e., those produced by the arms 27 41 being pressed away from the shaft *k* by the cams 32 42—are those which take place in a direction extending away from the chucks *e f* 95 and in an upward direction, wherein the hand 19 would be pulled off the can in the event of the can being arrested. The downward and inward motions of the hand 19 are all effected by the action of gravity on the weights 100 30 43, so that if there should be any obstruction one or both of the said weights would remain lifted and the roller on the corresponding arm or arms 27 41 will be kept out of contact with its cam or cams 32 42, and 105 thus damage to the machine or to the can prevented.

It is obvious that the spinning wheels can be of any suitable form and number and that the order of the several operations can be 110 modified without departing from the nature of our said invention.

We claim—

1. In an automatic feeding device the combination of an oscillating sleeve, an arm sliding in said sleeve and bearing a spring clip or "hand;" and means for oscillating said sleeve and for reciprocating said arm in said sleeve, substantially as described. 115

2. In a can-seaming machine, the combination of a frame, head-stocks sliding in guideways on the said frame, chucks fast upon the mandrels of the said head-stocks, a spring-clip for supplying boxes or cans successively between the said chucks, means connected 120 to said clip for oscillating the same, a cam-and-lever-operated device for positively moving the said head-stocks toward each other to carry the said chucks into engagement with a box or can presented between the said 125 chucks and away from each other to release the said box or can, a spring-actuated presser-pad arranged upon the face of each of the said chucks to effect the ejection of the seamed 130

box or can therefrom, and independently-operated means for effecting the adjustment of each of said head-stocks relatively to the actuating devices thereof, substantially as described.

3. In a can-seaming machine, the combination of a frame, head-stocks sliding in guideways on the said frame, a cam-operated sliding bar secured to one head-stock, an adjustable sleeve mounted on said sliding bar, a pivoted lever one arm of which projects into the path of said sleeve and the other arm of which is connected to the other head-stock, substantially as and for the purpose above specified.

4. In a can-seaming machine, the combination of a frame, head-stocks sliding in guideways on the said frame, a cam-operated sliding bar secured to one head-stock, a pivoted lever one arm of which is connected to the other head-stock and the other arm of which extends toward the said sliding bar, an adjustable sleeve mounted upon the said sliding bar for turning the said pivoted lever in one direction, and a spring for returning the said pivoted lever to its first position, substantially as described.

5. In a can-seaming machine, the combination of a frame, head-stocks sliding in guideways on the said frame, a cam-operated device for moving the said head-stocks toward and away from each other, and independently-operated leading-screws for effecting the adjustment of each of the said head-stocks relatively to the actuating devices thereof, substantially as described.

6. In a can-seaming machine, the combination with head-stocks sliding in guideways in a frame, of rotatable chucks in axial alignment and supporting boxes or cans successively supplied thereto, a rock-shaft, a longitudinally-adjustable bracket-support upon said rock-shaft, a bracket supported upon said rock-shaft, and spinning wheels rotatably mounted in adjustable carriages in the said bracket or frame, and operating successively upon the box or can supported between the said rotatable chucks, substantially as described.

7. In a can-seaming machine, the combination with head-stocks sliding in guideways in a frame, of rotatable chucks in axial alignment and supporting boxes or cans successively supplied thereto, a rock-shaft, brackets or frames adjustable axially along the said rock-shaft, spinning-wheels mounted in said brackets or frames and operating simultaneously upon both ends of the can-body supported between the said rotatable chucks, and means for moving the said wheels into and out of operative engagement with the ends of the can-body, substantially as described.

8. In a can-seaming machine, the combination with rotatable chucks for supporting boxes or cans successively supplied thereto,

of a rock-shaft supporting a bracket or frame, a spinning-wheel carriage adjustable in said bracket or frame, a second rock-shaft, means for oscillating the same, arms extending from said second rock-shaft and said bracket or frame respectively, and a link connecting said arms, substantially as and for the purposes described.

9. In a can-seaming machine, the combination with rotatable chucks for supporting boxes or cans successively supplied thereto, of a rock-shaft supporting a bracket or frame, a spinning-wheel carriage adjustable in said bracket or frame, a second rock-shaft, means for oscillating the same, arms extending from said second rock-shaft and said bracket or frame respectively and a nut and leadingscrew arranged on one of the said arms for adjusting the distance between the axis of the rock-shaft supporting the said arm and the axis of the pivot connecting the said arm to the link, substantially as described.

10. In a machine for the purposes specified, the combination of a spring clip or "hand," a rod supporting the said spring clip or hand, a bracket guiding the said rod, a rock-shaft supporting said bracket and cam-operated linkwork for oscillating said rock-shaft, and for sliding the said rod in the said bracket, substantially as described.

11. In a machine for the purposes specified, the combination of a spring clip or hand, a rod supporting the said spring clip or hand, a bracket guiding the said rod, a rock-shaft supporting the said bracket, cams arranged to oscillate bell-crank levers pivotally connected to links provided with turnbuckles for adjusting their respective lengths, said links being pivotally connected respectively to an arm fast on the rock-shaft supporting the said bracket and to an arm fast on a rock-shaft provided with an arm connected by a rod with a cross-head adjustably mounted on the said rod supporting the spring clip or hand, arranged and operating, substantially as described.

12. In a machine for the purposes specified, the combination of a spring clip or hand, a rod supporting the said spring clip or hand, a bracket guiding the said rod, a rock-shaft supporting the said bracket, cams connected by linkwork to the said bracket and rod respectively, an adjustable stop for respectively limiting the travel of the linkwork oscillating the said bracket and an adjustable stop for the linkwork reciprocating the said sliding rod, substantially as described.

In testimony whereof we have hereunto set our hands in presence of two witnesses.

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