(No Model.)

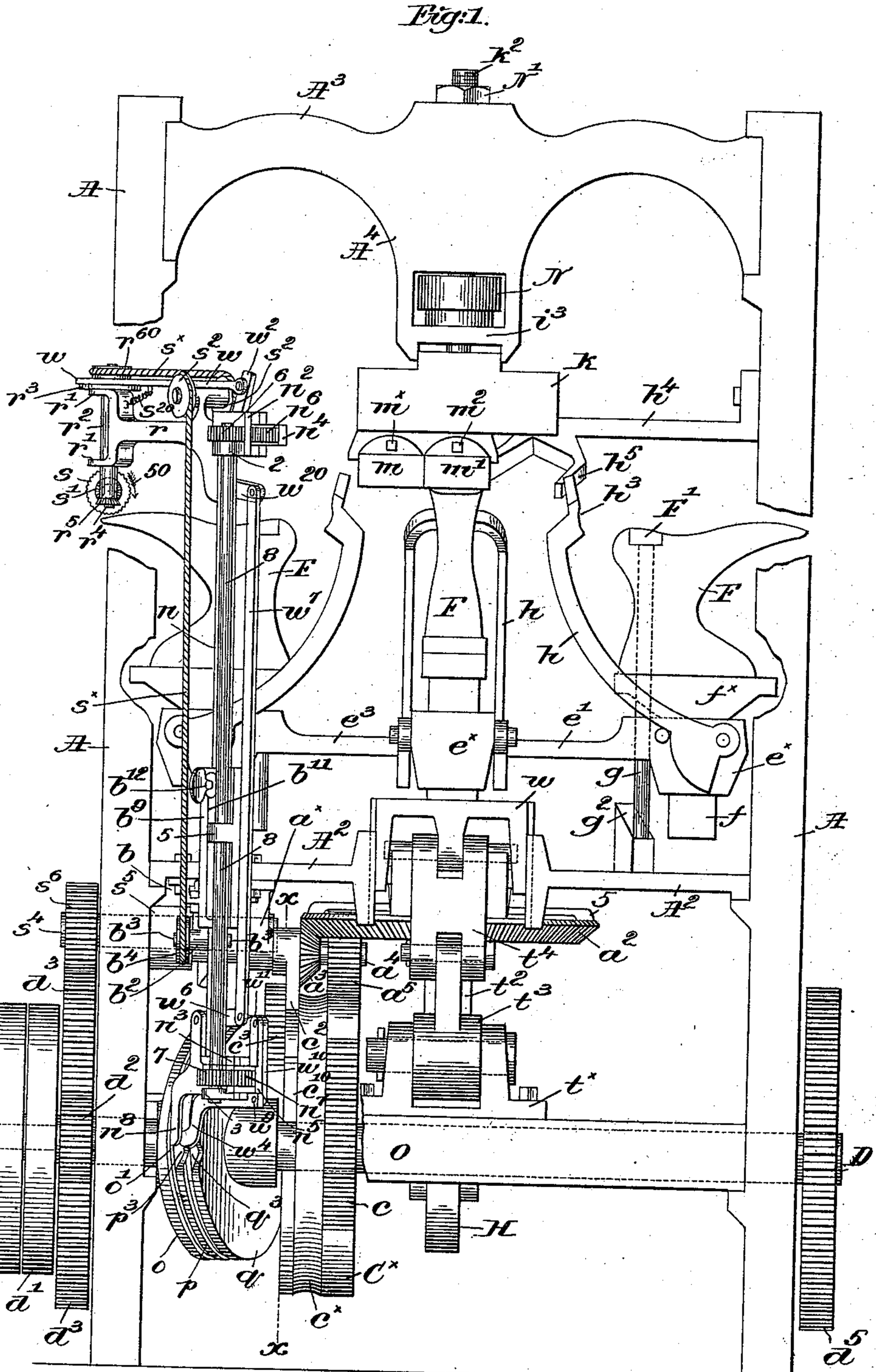
3 Sheets—Sheet 1.

W. L. BARRELL.

CHANNEL FLAP LAYING MACHINE.

No. 538,637. Patented Apr. 30, 1895.

Fig: 1.



Witnesses.
Edward F. Allen
Thomas J. Drummond

Inventor:
William L. Barrell,
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(No Model.) 3 Sheets—Sheet 2.

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CHANNEL FLAP LAYING MACHINE.

No. 538,637. Patented Apr. 30, 1895.

Fig: 2.

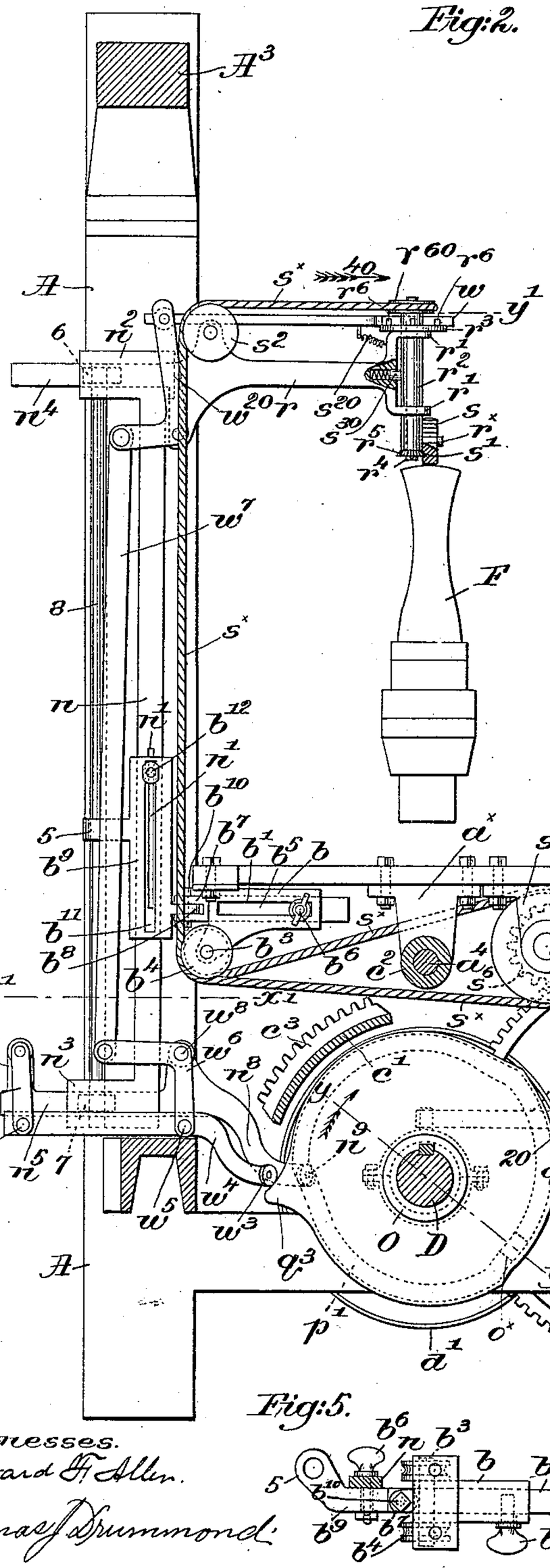

Fig: 2a.

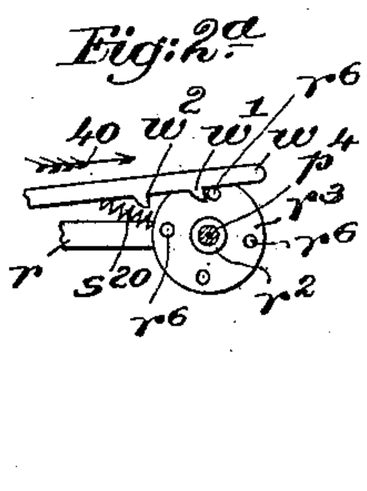

Fig: 5.

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(No Model.) 3 Sheets—Sheet 3.

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CHANNEL FLAP LAYING MACHINE.

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Fig: 3.

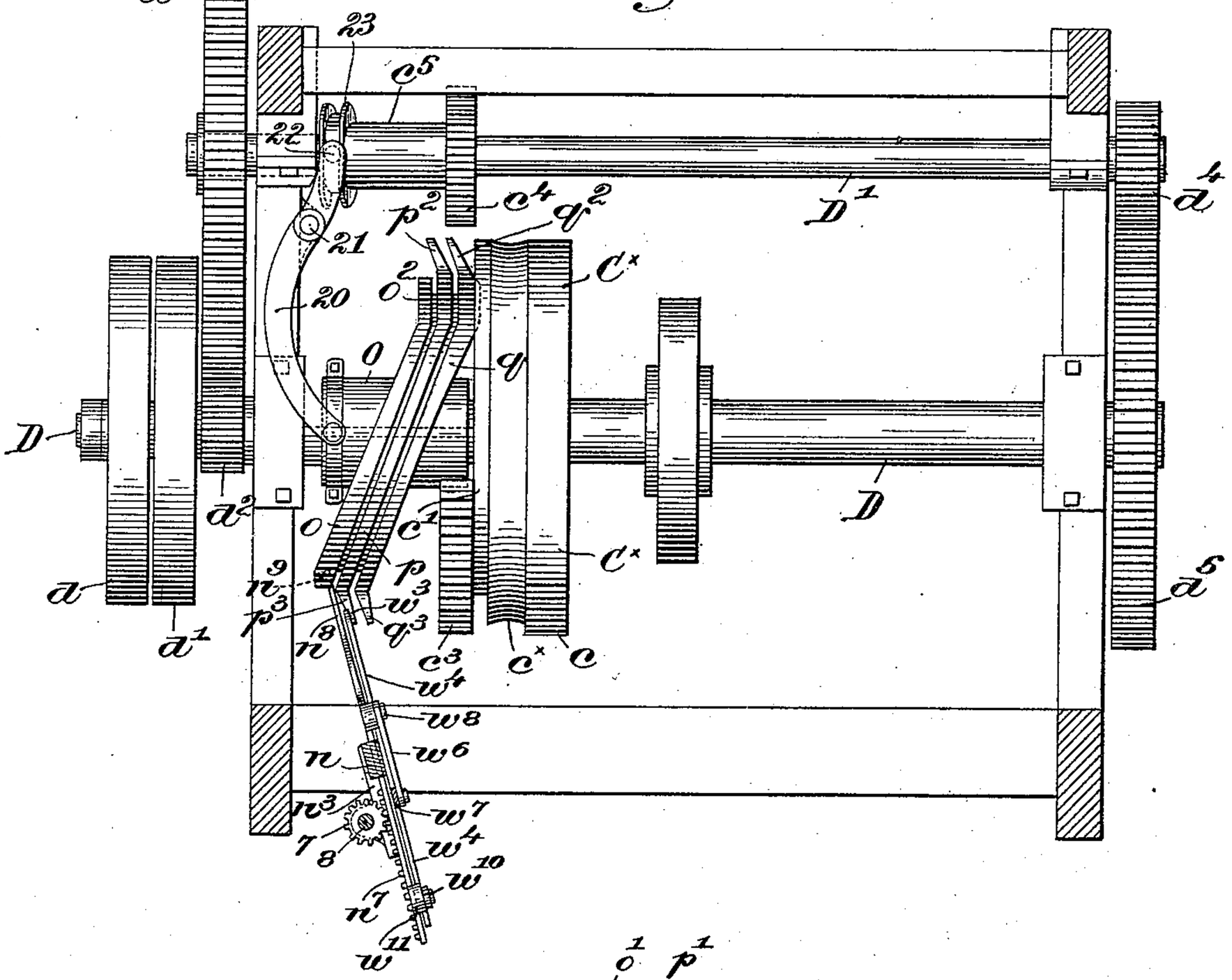
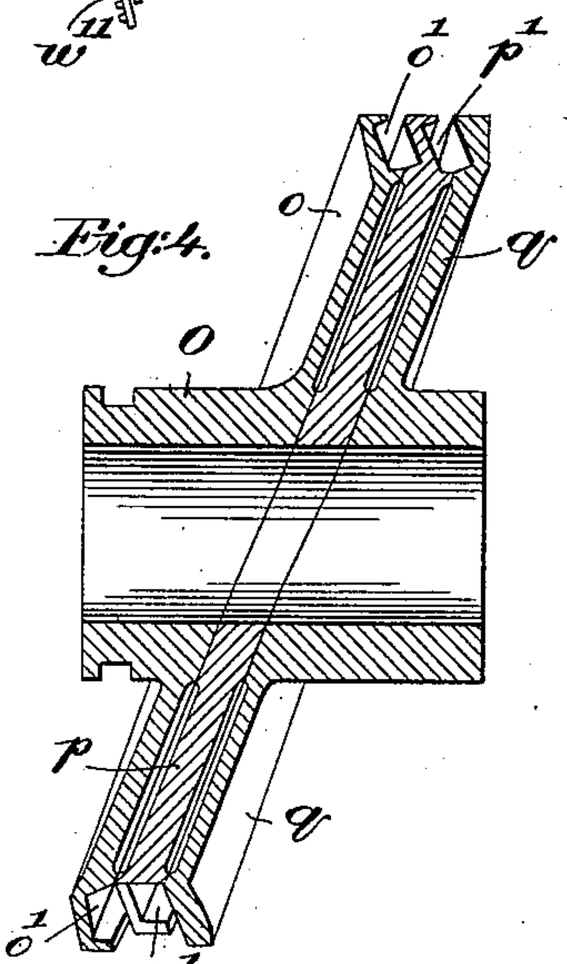


Fig: 4.



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UNITED STATES PATENT OFFICE.

WILLIAM L. BARRELL, OF LAWRENCE, MASSACHUSETTS.

CHANNEL-FLAP-LAYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 538,637, dated April 30, 1895.

Application filed July 27, 1894. Serial No. 518,692. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. BARRELL, of Lawrence, county of Essex, State of Massachusetts, have invented an Improvement in Channel-Flap-Laying Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and numerals on the drawings representing like parts.

This invention has for its object the production of a machine to lay the channel flap in the sole of a shoe preparatory to the leveling or beating out of the sole, and the mechanism hereinafter described is particularly adapted for use in connection with the sole leveling machine shown in United States Patent No. 522,776, granted to me the 10th day of July, 1894, to which reference may be had. In said patent a series of supports is successively brought into position to co-operate with a "former," said supports being preferably arranged for rights and lefts alternately, the "former" for each being automatically brought into position to co-operate with its particular support, means being provided to act upon the interior of the shoe to raise it from the support when leveled, and to push it partially off, so that the operator can readily remove it with one hand.

The channel flap laying mechanism which forms the subject of this invention is so applied to the leveling machine shown in said patent that the shoe to be leveled will, after having been placed upon a support by the operator, be moved into position to have the channel flap laid back into its original position in the channel with sufficient force to insure its retention by the cement with which the channel has been filled after the shoe has been sewed. After the channel flap has been laid, the shoe is moved into position to have the sole leveled or compressed.

My invention consists essentially in a rotary beater adapted to bear upon the sole and lay the flap, a swinging support for the beater, mechanism to actuate said support and controlling devices to govern the said actuating mechanism, whereby the beater follows and bears against the upper side of the flap and lays it in the channel, substantially as will be described.

Other features of my invention will be hereinafter described and particularly pointed out in the claims.

Figure 1 represents in elevation and partly broken out the rear side of a sole-leveling machine, as shown in the patent referred to, with my channel-flap-laying mechanism embodied therein. Fig. 2 is a vertical sectional view thereof, taken on the line $x\,x$, Fig. 1, and looking toward the left. Fig. 2^a is a detail to be described, taken below the line y', Fig. 2. Fig. 3 is a plan view, partly in section, taken below the line $x'\,x'$, Fig. 2. Fig. 4 is a sectional detail of the controlling-cams, taken on the line $y\,y$, Fig. 2; and Fig. 5 is a detail to be referred to.

The frame A, braces A^2 and A^3, head A^4, bevel gear a^2, small bevel gear a^3 engaged thereby and fast on a shaft a^4 supported in a bracket $a^\times$ secured to the brace A^2, the main shaft D having loose thereon belt pulleys d, d', the pinion d^2 fast to the pulley d', and engaging a large gear d^3 fast on an auxiliary shaft D', see Fig. 2, and the pinion d^4 fast thereon, the carrier, its shoe supports, ejectors and actuator therefor, the knock-off, the "formers" and so much of the actuating mechanism as is herein shown, are and may be as in said United States Patent No. 522,776, referred to, to which reference may be had, the same parts being lettered herein as shown in the said patent.

Referring to Fig. 1 of the drawings, the bevel gear a^2 is made as a ring, having its arms or spokes 5 extended beyond the plane of its upper side, to accommodate a gear a^5 fast on the short shaft a^4, to be engaged and rotated intermittingly by a segment gear $C^\times$ fast on the main or driving shaft D. See Figs. 1 and 3. This segment gear $C^\times$ is in construction and function the counterpart of the segment gear C in the patent referred to, and the teeth c on one-quarter of its circumference are sufficient in number to rotate the pinion a^5 once, and also the bevel gear a^3, the relative size of the gears a^2 and a^3 being such that one complete revolution of the latter will turn the former gear through one-quarter of a revolution, and as in said patent actuate the shoe supports on the rotatable carrier.

In order to make room for the controlling

cams of the channel flap laying mechanism, I have bodily moved, as it were, the said segment gear, toward the center of the machine, and have built it out at $c^{\times}$, Fig. 1, far enough to carry the periphery c' beyond the gear a^3, said periphery being cut away opposite the teeth c and slightly beyond the end ones, as at c^{10}, the said periphery c' being in the path of an escapement c^2 secured to the shaft a^4 and movable with the pinion a^5. As in the patent referred to, the curved face of the escapement rests on the periphery c' and holds the pinion a^5 from rotating until the teeth c are brought into engagement therewith, at such time the escapement c^2 turning with the shaft a^4 and entering the cut-away portion c^{10} of the periphery. A segmental gear c^3, see Figs. 1, 2 and 3, is secured to the peripheral portion c' of the segment gear $C^{\times}$, and is provided with just enough teeth to rotate a gear c^4 through one-half of a revolution, said gear being fast on a sleeve c^5 to be described, loose on the shaft D', best shown in Fig. 3. The pinion d^2 engages the large gear d^3 on the auxiliary shaft D', and a pinion d^4 fast thereon engages a gear d^5 fast on the driving shaft D, as shown in Fig. 3, whereby the speed of the driving shaft is reduced without reducing the speed of the driving belt.

Referring now to Figs. 1, 2 and 5, I have secured to the under side of the brace A^2 at the rear of the machine and at one side a bracket b, longitudinally slotted at b' and provided with bearings b^2 for studs or shafts b^3 having thereon idlers b^4 for a purpose to be described. The bracket b is interiorly recessed to receive therein a casting b^5 adapted to slide longitudinally in the bracket, and held in adjusted position by a suitable set screw b^6 extended through the slot b', the outer end of the casting having formed thereon ears b^7 to receive between them a lug b^8 of a fulcrum block b^9, held in place by and adapted to swing laterally on a vertical pivot pin b^{10} passing through said lugs and ear.

As best shown in Fig. 2, the fulcrum block b^9 is vertically slotted at b^{11} to receive the shank of a fulcrum pin or pivot b^{12} extended through a longitudinal slot n' in a swinging support, shown as a lever n, said lever being free to swing about said fulcrum pin in a vertical plane. Raising or lowering the fulcrum pin b^{12} raises or lowers the pivot about which the lever n swings and so varies the relative throw of its ends.

The swinging support or lever n is enlarged at its extremities, as at n^2 and n^3, and recessed to respectively receive therein slide bars n^4 and n^5, the outer ends of said bars being provided upon one of their sides with rack teeth n^6 and n^7, in engagement with like gears 6 and 7 fast on a shaft 8 extended through bearings 2 and 3 on the extremities of the lever n, and also through an intermediate bearing 5 on the fulcrum block b^9, whereby motion of one slide bar in one or the other direction in its support will be communicated to the other slide bar simultaneously. The inner end of the slide bar n^5 is prolonged and downturned as at n^8, and is provided at its end with a suitable roll n^9 to enter and be engaged by a cam groove o' formed in the inner face of a traverse cam o secured to or forming a part of a hub O keyed to the main or driving shaft D and longitudinally movable thereon.

The cam o, as best shown in Figs. 3 and 4, is so shaped that the cam groove o' is not in a single plane, but a portion of the cam at o^2, and also the groove therein, are at right angles to the longitudinal axis of the shaft D, so that no lateral movement will be imparted to the end n^8 of the slide bar n^5 while the roll n^9 traverses that portion or dwell of the cam. A second cam p having a cam groove p' thereon, is located on the hub O adjacent the cam o, the side of the cam p nearest thereto being suitably shaped to retain the end n^8 and its roll n^9 in the cam groove o' during the rotation of the cams.

It will be seen that the groove p' is formed in the side of the cam p farthest from the cam o, one of said grooves controlling the movement of the slide bar n^5 and its co-operating parts for a right shoe, the other groove controlling the movement for the left shoe, the cam p having a break $o^{\times}$ therein, see dotted lines Fig. 2, whereby the roll n^9 can pass from one to the other cam groove when the change is to be made from a right to a left shoe, or vice versa. A third cam q is shown adjacent the cam p, its inner side forming a guard to retain the roll n^4 in place when traversing the cam groove p'

The cams p and q are provided respectively with dwell portions p^2 and q^2, corresponding with the dwell o^2, as best shown in Fig. 3, and the break $o^{\times}$ in the center cam is located in such dwell portion. Regarding the center of the shaft, the grooves o' and p' are so shaped that the beater roll, to be described, will always be exactly over that portion of the channel flap of the shoe sole upon which it is acting, the shape of the groove p' being shown in dotted lines Fig. 2, the parts being in position to move the beater roll along from the center of the toe down one side and to the heel.

The dwell portions o^2, p^2 and q^2, of the cams take up one-quarter of the circumference of the respective cams, the beater roll being held from bodily movement at such time, while the shoe just completed is removed by the operation of the leveling mechanism, as described in the patent referred to, and a new shoe is presented to be treated, the throw of the lever a on its vertical pivot b^{10} back and forth taking place through the remaining three quarters of the circumferences of the traverse cams as they rotate. While the roll n^9 is stationary the cams are moved bodily on and in the direction of the length of the shaft D by means of a yoke lever 20, pivoted at 21, see Fig. 3, one end of which engages the hub O,

as shown, the other end of the said lever carrying a roll 22, shown in dotted lines Fig. 3, in engagement with a cam 23 fast on the sleeve c^5 loose on the shaft D'.

In the rotation of the shaft D the toothed segment c^3 is brought into engagement with the gear c^4 on the sleeve c^5 and rotates the latter sufficiently to swing the yoke lever 20 to the right or left, as the case may be, just as the break $o^\times$ in the cam p, arrives opposite the roll n^9, which is in one or other of the cam grooves o' or p', and the hub O is thereby moved to bring the said roll into the other cam groove, so that the mechanism is ready to operate on the next shoe.

Referring now to Figs. 1 and 2, the slide-bar n^4 is extended at its inner end to form an arm r having bearings r' for a vertical sleeve r^2 rotatably mounted therein, and maintained in position by an annular flange or plate r^3, see also Fig. 2^a, fast thereon, and adapted to rest on the top of the upper bearing r', a slight vertical movement of the sleeve being permitted. A shaft r^4 has its bearing in and projects beyond the sleeve r^2, and a bevel gear r^5 is secured to its lower end to engage a bevel gear s' on the inner face of a beater s, herein shown as a roll mounted to rotate on a stud $r^\times$ projecting from the sleeve r^2.

In practice I preferably make the beater roll about three inches in diameter and about an inch face, the latter having a saw-like or ribbed surface.

The upper end of the shaft r^4 above the flange or plate r^3 has fast thereon a whirl r^{60}, about which is passed an endless band or cord $s^\times$, which is carried over idlers s^2 on the arm r and thence around the idlers b^4 to a driving pulley s^3 supported on a shaft s^4 having its bearings in a bracket or hanger s^5, and rotated by a gear s^6 in engagement with the gear d^3, as best shown in Fig. 2.

By means of the band $s^\times$ and intermediate connections the beater roll s is rotated at a high rate of speed and always in the same direction.

The particular shape of the cam grooves o' and p' control the lateral movement of the beater roll s in its movement from the heel to the toe and back on the other side of the shoe to the heel, swinging the lever n and all its parts as a whole about the fulcrum b^{12}, it being remembered that one cam groove is for a right and the other for a left shoe.

Inasmuch as shoes of different sizes vary in width the lateral throw of the roll s must be greater in some instances than in others, and to provide for this variation the fulcrum b^{12} of the lever n is made vertically adjustable, lowering of said fulcrum increasing the throw of the beater roll, and vice versa.

The plane of the traverse or controlling cams govern the movement of the beater roll from heel to toe of a shoe, and to provide means for adjusting the length of such movement I have made the casting b^5 adjustable in the bracket b, as described. When the said casting is moved to the left, Fig. 2, it carries with it the fulcrum block b^9, lever n and shaft 8, and such movement of the shaft causes the gear 7 to rotate as it travels over the rack teeth n^7 of the slide-bar n^5. This rotation of the shaft 8 in turn causes the gear 6 to travel over the rack n^6, so that the slide-bar n^4 remains stationary, and the greater the movement of the lever n to the left or outwardly, the greater will be the length of the lever arm of the slide-bar n^5, or in other words the greater the distance between perpendiculars through the pivot pin b^{10} and the roll n^9. It follows that the shorter the lever arm n^8 the greater will be the swing of the lever n, and the longer the travel of the beater roll in the direction of the length of the shoe, and as the length of shoes vary the travel of the beater roll is adjusted to accord therewith, by increasing or decreasing the length of the lever arm n^8 of the slide-bar. The throw of the beater roll is greater than the lateral movement of the roll n^9 at all times, however, for the distance between the beater roll s and pivot b^{10} is always greater than the distance between said pin and the roll n^9, measured between perpendiculars.

As different sizes of shoes have a certain ratio between the length and width, I will provide suitable scales on the fulcrum block b^9 and the bracket b, so arranged that when a given size of shoe is being operated upon, the operator will only have to set the centers of the set screws or clamps b^6 and b^{12} opposite the proper graduations on their respective scales, and the mechanism will operate properly. The rotation of the beater roll s is in the direction of the arrow 50, Fig. 1, or from the center of the shoe sole outward toward its edge, so that the action of the roll upon the channel flap is from its base to its free edge, and in order to always maintain such rotation relative to the center of the shoe, to gradually lay the channel flap, it is necessary that the support for the beater roll be turned on its axis at the heel and toe of the shoe.

The annular flange or plate r^3 has four pins or projections r^6 on its upper side, to be engaged by lugs w', w^2, on the adjacent side of a rod w resting on said flange and pivotally connected to a bell-crank lever w^{20} on the arm r, the rod being held in engagement with the pins r^6 by a spring s^{20}, Figs. 2 and 2^a. When the rod or actuator w is moved by the lever w^{20} in the direction of the arrow 40, the lug w', engaging one of the pins r^6, will rotate the flange r^3 and its attached sleeve r^2 through one-quarter of a revolution, whereupon the lug w^2 will come into engagement with the next pin r^6 and move it to complete the turn, the pin engaged by lug w' having been moved out of engagement therewith by the described movement of the flange. At the end of the throw of the actuator w to the right the pin engaged by the lug w^2 will have been moved through one hundred and eighty degrees from its original position, and the next succeeding

pin will be in position to be engaged by the lug w' upon its next forward movement, which takes place after its return to its original position by means to be described. Each movement of the actuator to the right will thus turn the sleeve r^2, and consequently the beater roll s supported thereby, through an arc of one hundred and eighty degrees, a detent, herein shown as a spring pin s^{30}, bearing against the sleeve and preventing by its friction accidental rotation of the sleeve. The actuator is drawn toward the path of the pins r^6 in a yielding manner by suitable means, herein shown as a spring s^{20}, secured at one end to the actuator w, and at the other end to the arm r, the backs of the lugs w' and w^2 being curved to easily ride over the pin in its movement opposite the arrow 40.

Beginning at the heel of the shoe, the channel flap of which is to be laid, the axis of the beater roll is substantially parallel to the median line of the sole, and such position is maintained until nearing the toe, when the turning begins, and when the center of the toe is reached the beater roll axis is at right angles to the median line. Continuing around the other side of the toe the roll is turned ninety degrees more and the flap on that side of the sole is laid. When the heel is reached the roll is turned through one hundred and eighty degrees until in its original position, to start a new shoe. These changes are accomplished by means of the peripheries of the cams p and q acting on a suitable roll w^3 carried by a link w^4 pivotally connected at w^5 to one arm of an elbow lever w^6, the other arm of said lever being connected by a link w^7 to the elbow lever w^{20}, as clearly shown in Fig. 2, the cam peripheries being shaped according to the particular style of shoe to be treated. The elbow lever w^6 is pivoted at w^8 to the slide-bar n^5, and to the more securely connect the link w^4 to and to move bodily with said slide-bar, its outer end is connected at w^9 by a short link w^{10} to an arm w^{11} erected on the outer extremity of the slide-bar, the length of said link between centers being equal to the distance between the pivotal points w^5 and w^8. As the controlling mechanism described moves laterally with the lever n and its attached parts, the roll w^3 would leave the periphery of the traverse cams at the points of greatest throw, and to obviate this the raised portions p^2, p^3, and q^2, q^3, on said cams are bent out of the plane of the cams, as shown in Figs. 1 and 3, so that the roll w^3 may travel thereon, and yet such raised portions of the cams will not interfere with the lever n^8.

Referring to Fig. 2, it will be seen that the periphery of either cam follows the shape of its internal groove, so that the rolls n^9 and w^3 will move in unison except at the raised portions p^2, q^2, &c. The portions p^3, q^3, turn the beater roll at the toe of the shoe, while the portions p^2, q^2, turn it at the heel, and the shape of the toe controlling portions will be varied according to the shape of the toe of the shoe to be operated upon.

It is to be understood that when the shifting mechanism operates to shift the roll n^9 from one to the other of the cam grooves o' and p', the roll w^3 is at the same time transferred to one or other of the cams p or q, according as a right or left shoe is being operated upon.

It is unnecessary to further describe the operation of the apparatus in view of the foregoing detailed description, the channel flap of one shoe after another being laid rapidly and accurately prior to the presentation of the shoe to the "former" to level the sole thereof.

My invention is not restricted to the particular construction and arrangement of parts as herein shown, as they may be varied in different particulars without departing from the spirit and scope of my invention.

I claim—

1. In a machine for laying the channel flap of boots or shoes, the following instrumentalities, viz:—a rotary beater to bear upon the sole and lay the flap, a swinging support for the beater, mechanism to actuate said support, and controlling devices to govern the said actuating mechanism, whereby the beater is made to follow and bear against the upper side of the flap and lay it in the channel, substantially as described.

2. In a machine for laying the channel flap of boots or shoes, the following instrumentalities, viz:—a beater to bear upon the sole and lay the flap, a swinging support for the beater, means to adjust the throw of said support, actuating mechanism to swing it in a lateral plane, flexible connections between said beater and a continuously rotating part of the machine, to rotate the beater on its axis, and controlling devices to govern the movement of the actuating mechanism, whereby the beater follows the channel flap around the shoe, substantially as described.

3. In a machine for laying the channel flap of boots or shoes, the following instrumentalities, viz:—a support adapted to swing across and also in the direction of the length of the shoe, means to adjust the extent of such movements, a rotatable beater roll mounted in and adapted to be rotated in the said support, actuating mechanism to swing the support, controlling devices for said mechanism, and intermittingly operated mechanism to turn the beater roll in its support at the heel and toe of the shoe, substantially as described.

4. In a machine for laying the channel flap of boots or shoes, the following instrumentalities, viz:—a rotary beater roll to bear upon the sole and lay the flap, a swinging support therefor, a fulcrum block mounted on a vertical pivot, a lever carried by said block and adapted to swing on an adjustable pivot therein, and connections between the lever and swinging support, combined with a controlling cam, and connections between it and the lever, whereby the latter is swung on its pivot and also about

the pivot of the fulcrum block, the cam governing such movements, to thereby cause the beater roll to follow the channel flap and lay the same, substantially as described.

5. In a machine for laying the channel flap of boots or shoes, the following instrumentalities, viz:—a rotary beater to bear upon the sole and lay the flap, a swinging support for the beater, mechanism to actuate said support, controlling devices, comprising two cams and connections between them and the swinging support, to govern the actuating mechanism, one of said cams being for a right and the other for a left shoe, and shifting devices to render one or the other cam operative, substantially as described.

6. In a channel flap laying apparatus, a lever adapted to swing about a vertical and a horizontal pivot, means to adjust the said pivots to change the throw of the lever, slide bars carried at opposite ends of the lever, a rotary beater roll mounted in one, actuating and controlling cams connected to the other, and connections between said slide-bars to move them in unison relatively to the lever, substantially as described.

7. In a channel flap laying apparatus, a rotatable shaft, a longitudinally movable hub rotatable therewith, a series of traverse cams thereon, a slide-bar having a roll adapted to be engaged by one or other of said cams, and intermittingly operative shifting mechanism to move said hub and cams longitudinally and thereby transfer the roll from one to another cam, combined with a swinging support, a rotary beater roll mounted therein, and connections between said support and slide-bar, whereby the said cams actuate and control the movement of the swinging support, substantially as described.

8. In a channel flap laying machine, a swinging support, mechanism to actuate and control its movements, a sleeve mounted to rotate in bearings in said support, a beater roll carried by the sleeve, means to rotate the roll continuously, and an intermittingly operated actuator to turn said sleeve and thereby change the position of the roll, substantially as described.

9. In a channel flap laying machine, a swinging support, a sleeve like carrier for the beater roll, a beater roll having a bevel gear on its inner side and mounted to rotate on a stud secured to said carrier, a shaft extended through said carrier and having a bevel gear thereon in mesh with the beater roll gear, driving mechanism to rotate said shaft and beater roll continuously, and devices to intermittingly turn the sleeve-like carrier in the swinging support, substantially as described.

10. In a machine for laying channel flaps, a swinging support, a sleeve-like carrier mounted therein for the beater roll, an annular flange on and retaining the said carrier in place, a series of pins on the top of the flange, a reciprocating actuator provided with lugs to engage said pins at times and thereby partially rotate said flange and the carrier, a detent for the carrier, and means to reciprocate the actuator at predetermined times, substantially as described.

11. In a channel flap laying machine, a swinging support, a sleeve-like carrier mounted therein for the beater roll, a stud secured externally to the carrier, a beater roll having a beveled gear on one of its sides and mounted to rotate on said stud, an actuating shaft having a bearing on the carrier and provided with a beveled gear to mesh with the beater roll gear, driving mechanism to rotate said shaft and thereby the beater roll, and means to move the carrier in the swinging support, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM L. BARRELL.

Witnesses:

JOHN C. EDWARDS,

AUGUSTA E. DEAN.