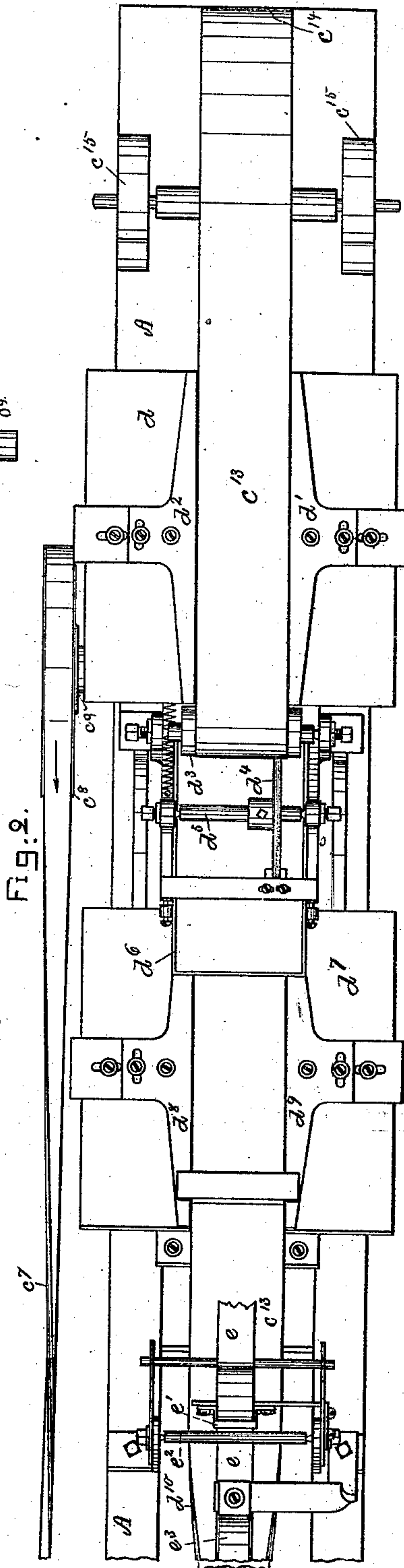
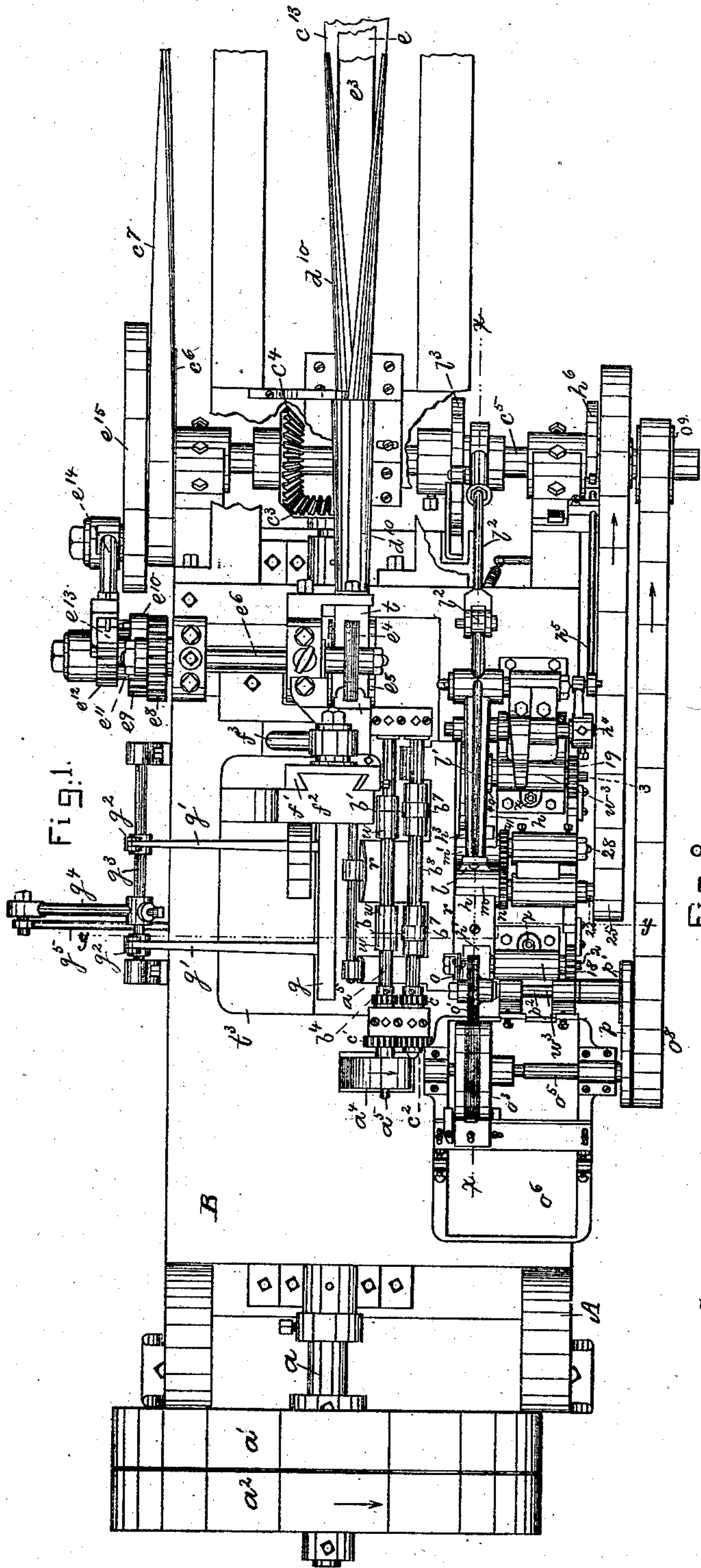


(No Model.)

4 Sheets—Sheet 1.

C. BOYCE.

Machine for Covering Webbing for Boot Straps.  
No. 239,434. Patented March 29, 1881.



Witnesses.

Arthur Reynolds.  
Bernice L. Hayes.

Inventor.  
Charles Boyce.  
By Crosby & Gregory Attys



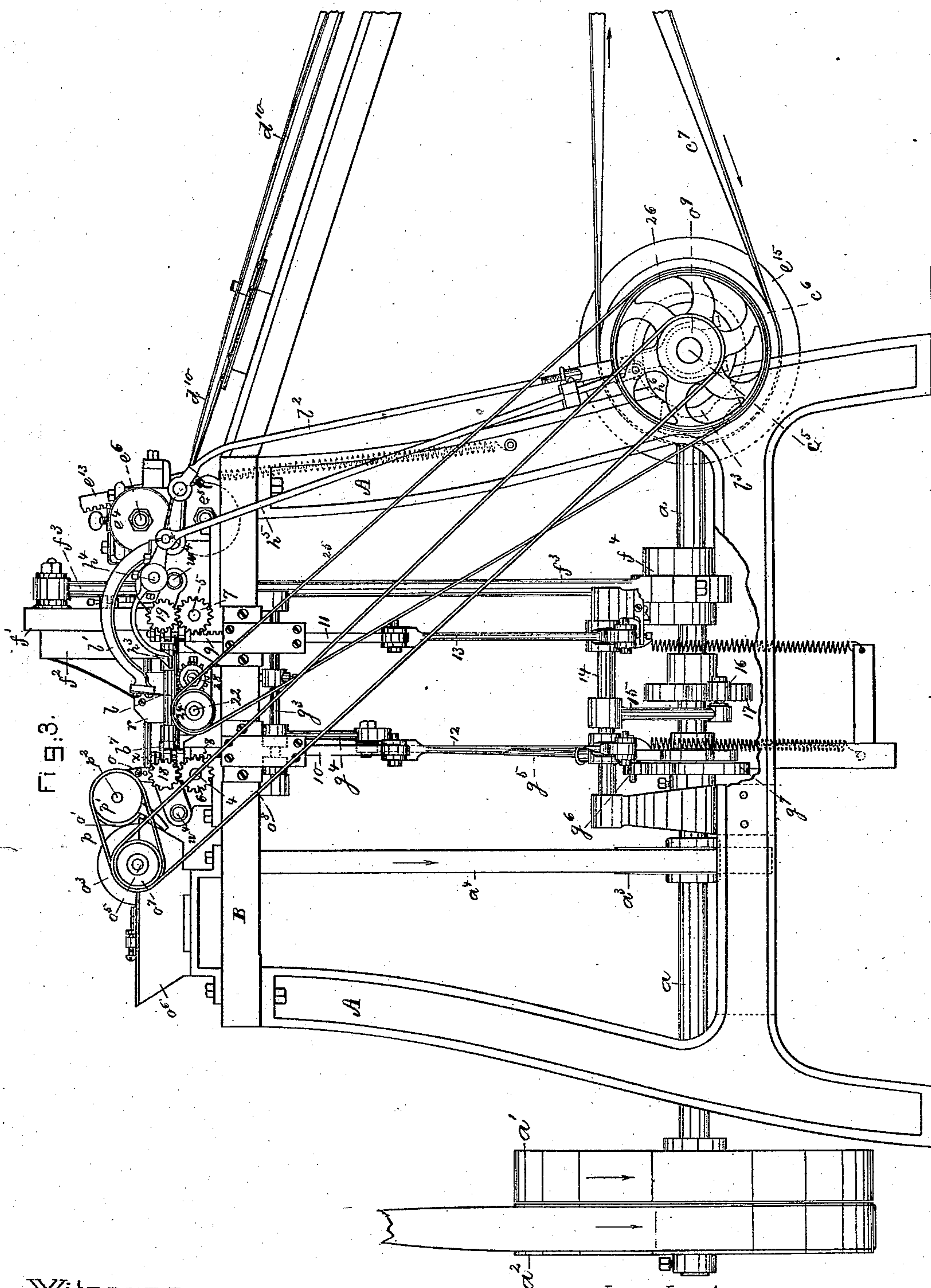
(No Model.)

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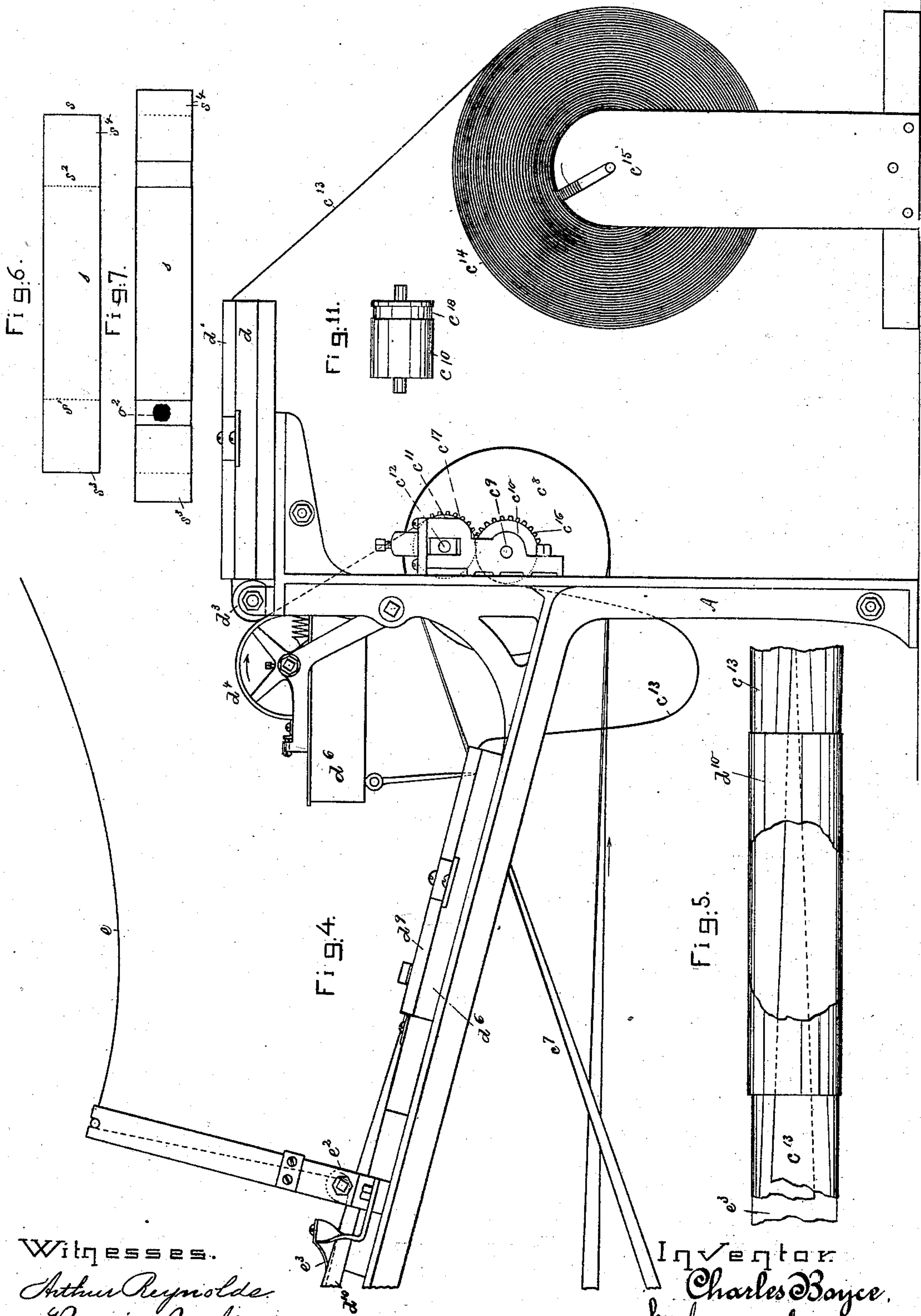
(No Model.)

4 Sheets—Sheet 3.

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Witnesses.

Arthur Reynolds  
Bernice J. Hayes

Inventor  
Charles Boyce.  
by Crosby & Gregory,  
Attys.

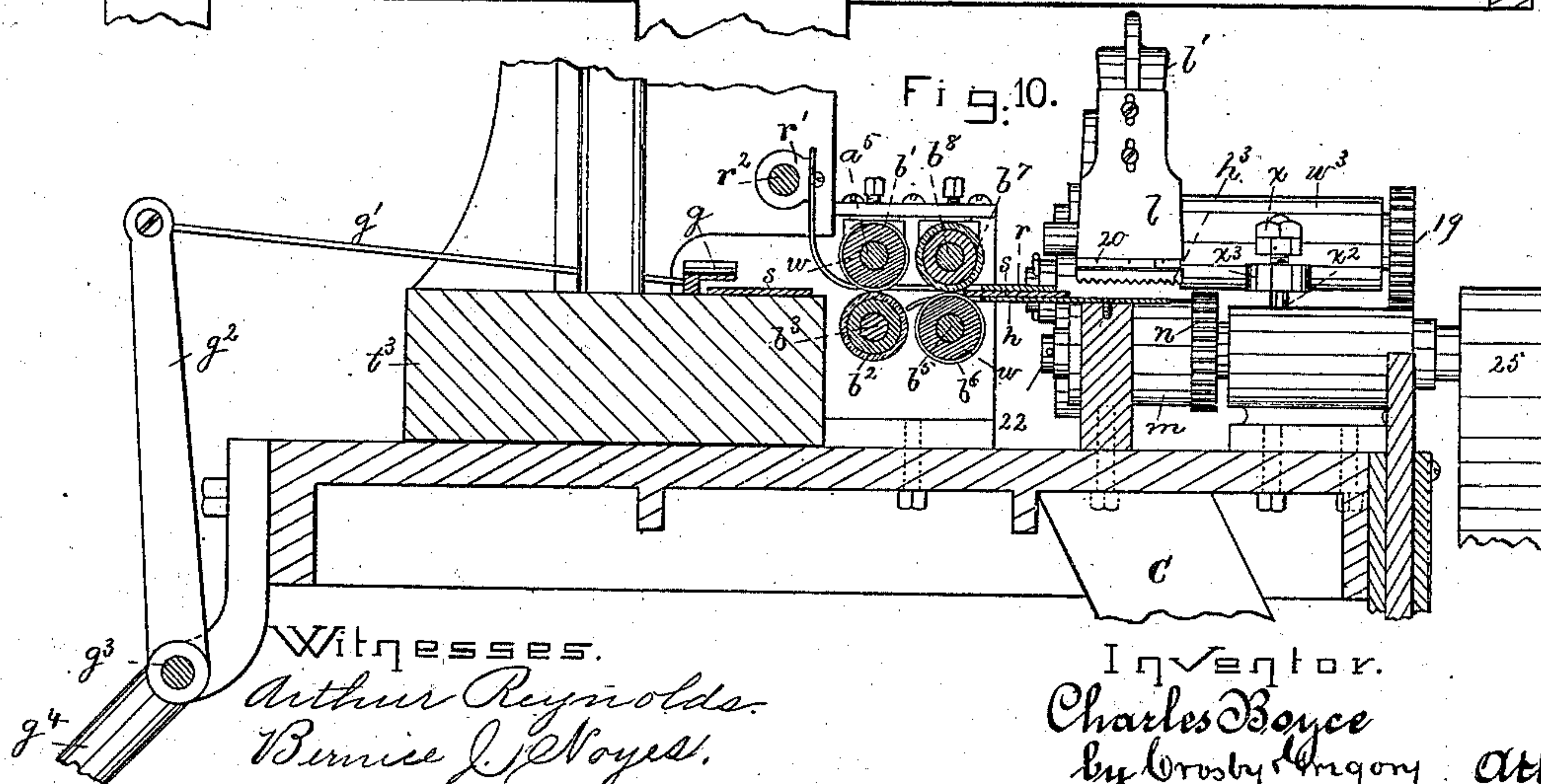
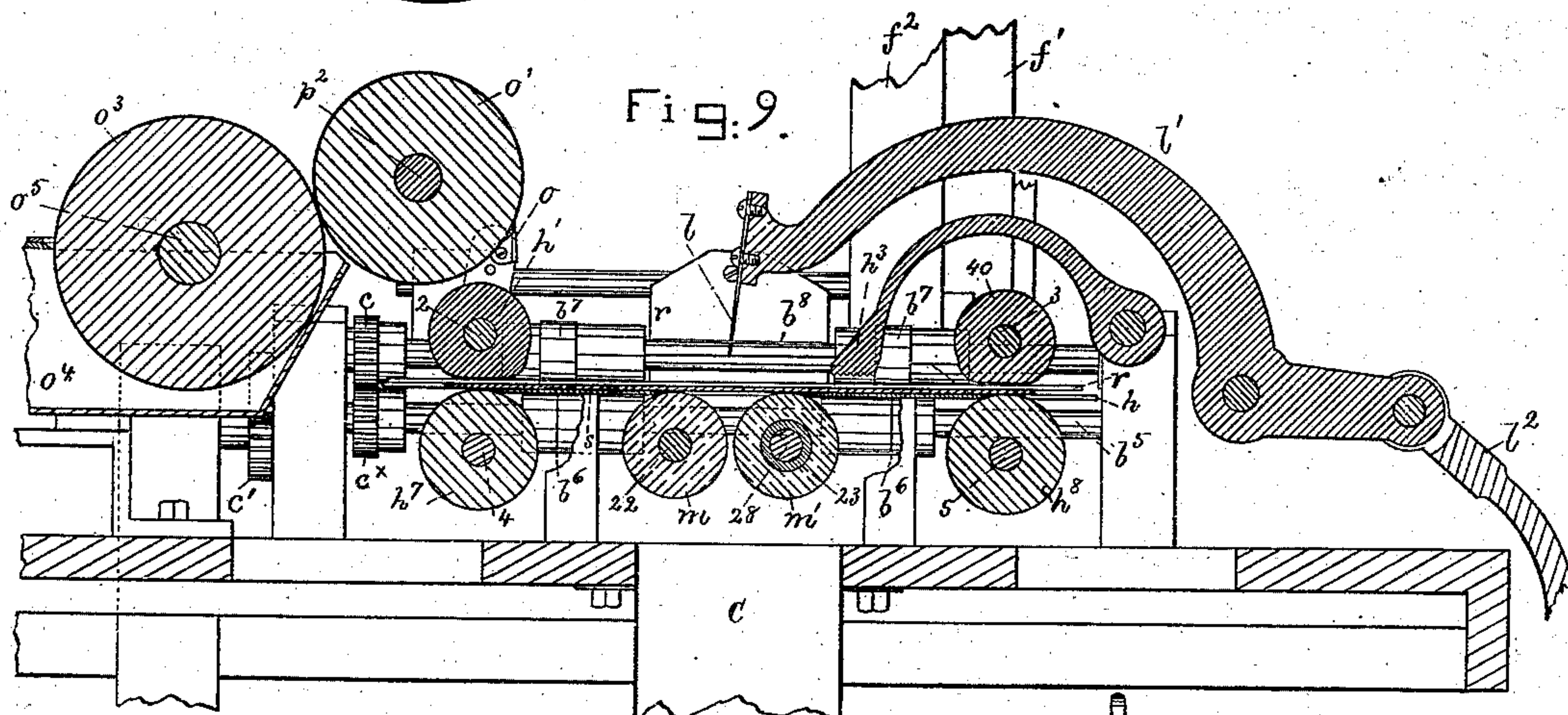
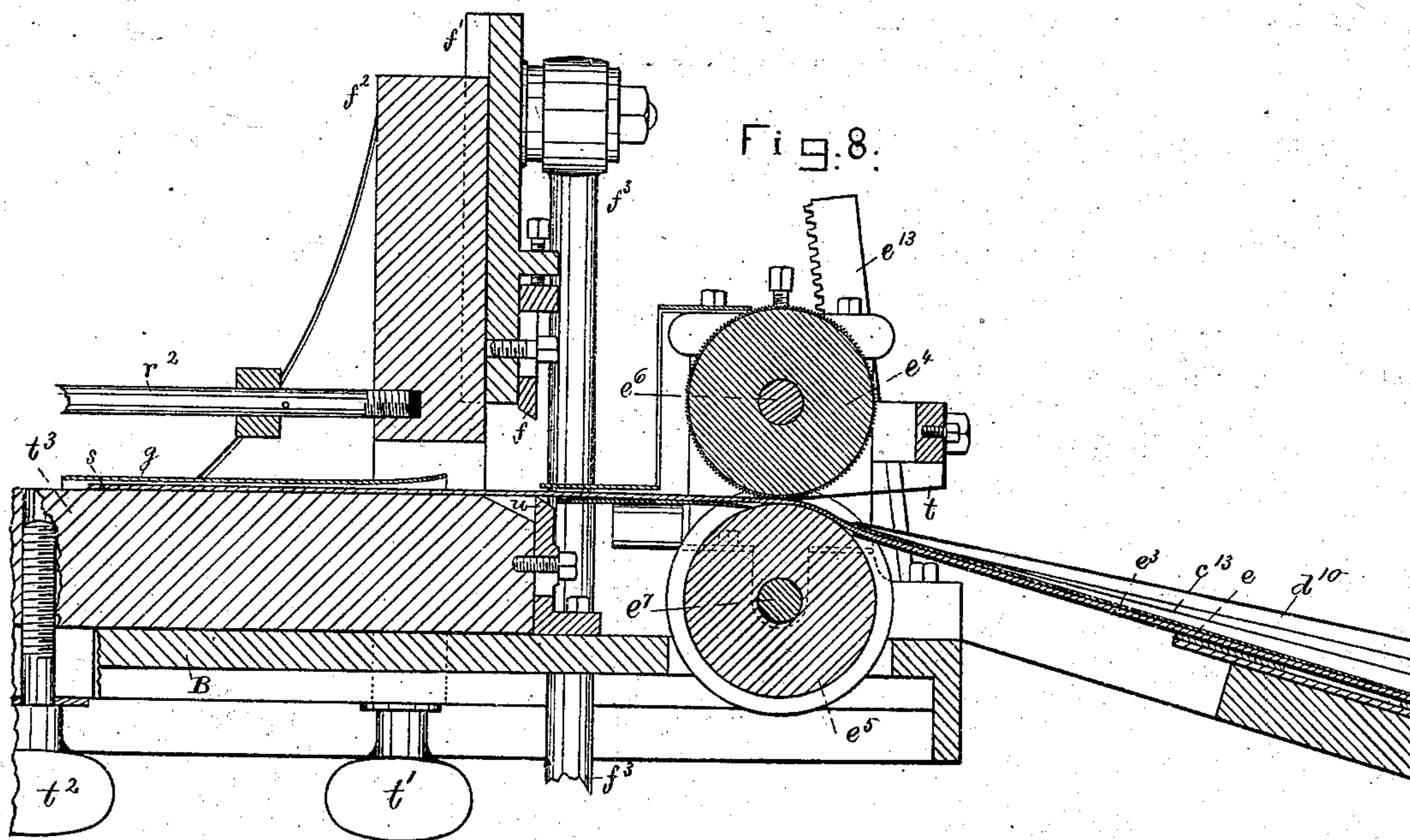


(No Model.)

4 Sheets—Sheet 4.

C. BOYCE.

Machine for Covering Webbing for Boot Straps.  
No. 239,434. Patented March 29, 1881.



Witnesses.

Arthur Reynolds.  
Bernice J. Noyes.

Inventor.

Charles Boyce  
by Crosby & Morgan Attys.



# UNITED STATES PATENT OFFICE.

CHARLES BOYCE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO AUGUSTUS BROWN, OF SAME PLACE.

## MACHINE FOR COVERING WEBBING FOR BOOT-STRAPS.

SPECIFICATION forming part of Letters Patent No. 239,434, dated March 29, 1881.

Application filed January 20, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES BOYCE, of Boston, county of Suffolk, and State of Massachusetts, have invented a new and useful Improvement in Machines for Covering Webbing, &c., of which the following description, in connection with the accompanying drawings, is a specification.

This invention in machines for covering webbing has for its object to cover webbing for boot-straps and other purposes. In the production of covered boot-straps by this my machine the webbing is covered throughout its length with a continuous web of paper, the edges of which are pasted together, and so covered the material is automatically cut into pieces suitable for straps of the desired length. The covering is then perforated or slitted transversely, so as to leave an unbroken tube of paper on the fibrous or woven part of the strap of sufficient length to cover that part of the boot-strap which in the finished boot is to be exposed, and then the end of the tube of paper beyond the transverse perforations or slits therein are automatically drawn from the ends of the fibrous or woven part of the strap, and the latter, pasted at or near the end of the tubular paper covering which is to remain as part of the strap, is folded into the shape of a boot-strap and held in such shape by the paste.

In the manufacture of boots and shoes light-colored and fancy webbings are employed for the straps, and to prevent them from becoming soiled while the boot and shoe is being made, as well as in the stores, it has been found necessary to cover the said straps with paper.

My invention in machines for covering webbing consists, essentially, in organizing in a machine paper and webbing feeding mechanism, mechanism to fold the paper into tubular form about the webbing, pasting mechanism to paste the edges of the paper tube and inclose the webbing, cutting mechanism to sever the pasted tube and webbing within it into pieces of proper lengths for boot-straps, and mechanism to fold the covered straps or pieces of webbing, substantially as described. Also, in a machine for covering webbing for boot-straps, tube-perforating mechanism to perforate, transversely near its ends, the pasted tube inclosing the woven portion of the boot-

strap, in order that the end of the said paper tube may be withdrawn or pulled from the said woven portions, leaving its end uncovered, substantially as described. Also, in a presser to act upon and hold the boot-strap, combined with drawing-off mechanism to draw or pull off therefrom the ends of the tube outside the transverse perforations or slits. Also, in the pusher to move the paper-covered boot-strap laterally into position to have the paper tube perforated transversely, and perforating cutters and elastic supports, between which the paper-covered strip is passed to perforate the paper tube at both sides, combined with a presser or holder to hold the paper-covered strap in fixed position, and with drawing-off mechanism to pull or draw off from the woven part of the strap the ends of the paper tube covering it. Also, in a presser to hold a perforated paper-covered strap, and mechanism to automatically pull or draw the ends of the paper tube from its central portion, combined with a folding blade and rollers.

My invention also consists in other features and improvements hereinafter set forth in the claims at the end of the specification.

Figure 1 represents, in top view, the upper part of a machine for covering webbing for boot-straps in accordance with my invention. Fig. 2 represents a similar view of that part of my machine broken away from the right-hand end view of Fig. 1. Fig. 3 is a side elevation of Fig. 1. Fig. 4 is a side elevation of Fig. 2. Fig. 5 is a detail of part of the folder for wrapping and folding a web of paper into tubular form about the webbing, the said folder being broken out to show the lap of one edge of the paper over the other edge. Fig. 6 represents a boot-strap inclosed within a pasted paper tube, the dotted lines indicating the transverse perforations or slits in the paper tube. Fig. 7 is a similar view with the ends of the paper tube partially drawn off the woven part of the strap inclosed within the paper tube. Fig. 8 is an enlarged sectional detail of the webbing and tube-feeding mechanism, and the cutting mechanism to sever the covered webbing into straps of suitable length. Fig. 9 is a sectional detail on the dotted line *x x*, Fig. 1. Fig. 10 is a vertical sectional detail on the line *y y*, Fig. 1, and Fig. 11 is a detail of the roller *c*<sup>10</sup>.

The frame-work A of the machine will be of



suitable shape to properly support the working parts, B being a bed-plate therefor. The main shaft  $a$  of the machine, having usual fast-and-loose pulleys  $a'$   $a^2$ , has at one end of it a bevel-gear,  $c^3$ , which engages with a bevel-gear,  $c^4$ , on a shaft,  $c^5$ . The shaft  $c^5$  has a pulley,  $c^6$ , upon which is a band,  $c^7$ , (see Fig. 1,) which extends about a pulley,  $c^8$ , (see Figs. 2 and 4.) connected with a shaft,  $c^9$ , having upon it a roller,  $c^{10}$ , which, co-operating with a roller,  $c^{11}$ , on a shaft,  $c^{12}$ , serves to feed forward at the proper speed the web  $c^{13}$  of paper, it being taken from a roll of paper,  $c^{14}$ , suitably supported in uprights or bearings  $c^{15}$ . The rolls  $c^{10}$   $c^{11}$  are geared together by pinions  $c^{16}$   $c^{17}$ .

The web of paper  $c^{13}$  is passed over a flat plate,  $d$ , between suitable adjustable gages  $d'$   $d^2$ , which control the edges of the paper, thence over a roller,  $d^3$ , where it is acted upon by the paste-applying roller  $d^4$  on a shaft,  $d^5$ , the said roller running in a paste box or trough,  $d^6$ , and applying paste to the web of paper along one of its edges. The paste-roller is moved solely by its friction against the web of paper. The pasted web is then made to pass between the paper-feeding rollers  $c^{10}$   $c^{11}$ , before described, the roller  $c^{10}$  (see Fig. 11) being grooved, as at  $c^{18}$ , to permit the passage of the pasted part of the web of paper between the said rolls without spreading the paste thereon. The pasted web of paper is then passed over a bed,  $d^7$ , between the edge-guides  $d^8$   $d^9$ , and into the folding-guide  $d^{10}$ , which is composed of a long piece of metal, tapered and folded along its edges, as shown, and preferably made in two pieces, so as to enable its delivery end to be changed, as may be desired, to the size of paper tube to be formed. This folding-guide  $d^{10}$  is made tapering in the direction of its length, so as to gradually fold the paper at both edges and ultimately lap one edge of the web of paper over the other edge thereof for a greater or less distance, always sufficiently, however, to cause the pasted part of one edge of the paper to meet the unpasted part of the other edge of the paper and form a tube or covering for the webbing  $e$ , which, supplied from a suitable roll or reel and led through a guide,  $e'$ , (see Fig. 2,) and under a roll,  $e^2$ , is laid upon the web  $c^{13}$  of paper just as it enters the folding-guide  $d^{10}$ . The web  $e$  extends under the former  $e^3$ , which is a narrow strip of sheet metal, of substantially the width of the webbing, and about which and the webbing the folding-guide wraps the web of paper  $c^{13}$  in the formation of the tubular pasted covering. The webbing, having the paper pasted about it in tubular form, is passed between the webbing and tube-feeding mechanism composed of the two rollers  $e^4$   $e^5$  on shafts  $e^6$   $e^7$ , the bearings of shaft  $e^4$  being preferably adjustable, in order to place the periphery of the roller  $e^4$  at the proper distance above the roller  $e^5$ , according to the thickness of the webbing and paper between them.

The shaft  $e^6$  has upon it a pinion,  $e^8$ , which is made to engage a pinion of same size di-

rectly below it on the shaft  $e^7$ . At the side of this pinion, which is secured to the said shaft  $e^7$ , (the said pinion not being herein shown in the drawings,) is secured a ratchet-wheel,  $e^9$ , (see Fig. 1,) which is engaged by the pawl  $e^{10}$  on a rotating pawl-carrying sleeve,  $e^{11}$ , having connected with it a toothed gear,  $e^{12}$ , the said toothed gear  $e^{12}$  and pawl-carrier having imparted to them rotary reciprocating movements by means of a reciprocating rack,  $e^{13}$ , at the end of a bar,  $e^{14}$ , adjustably connected with the disk  $e^{15}$  on the shaft  $c^5$ , the adjustment of this bar  $e^{14}$  toward and from the center of the disk  $e^{15}$  and shaft  $c^5$  enabling less or more movement to be imparted to the pawl-carrier, and consequently a less or greater extent of feed to the combined webbing and tubular covering enveloping it, as is necessary to adapt the machine to the length of the boot-strap which it is desired to produce.

After passing between the rollers  $e^4$   $e^5$ , the webbing, enveloped in the pasted paper tube, is fed forward under the webbing-cutter  $f$ , (see Fig. 8,) adjustably connected with the lower end of a cross-head,  $f'$ , fitted to slide vertically on a guideway,  $f^2$ , the said cross-head being reciprocated by a link,  $f^3$ , connected with it, and having its lower end placed about an eccentric,  $f^4$ , on the shaft  $a$ . The tubular paper covering and webbing are not cut off until the end of the tubular covering and webbing have been fed forward beyond the cutter  $f$  for a distance equal to the length of the strap to be produced. The webbing so cut off I shall denominate as a "strap." The strap severed from the webbing has its right-hand edge placed below and in contact with the strap-pusher  $g$ , connected, by links  $g'$ , with arms  $g^2$  of a rock-shaft,  $g^3$ , one arm,  $g^4$ , of which (see Fig. 3) is connected with a rod,  $g^5$ , forked at its lower end to straddle the shaft  $a$ , and provided with a roll,  $g^6$ , to bear on a cam,  $g^7$ , on the said shaft  $a$ , the said cam reciprocating the said rod  $g^5$ , turning the rock-shaft  $g^3$ , and causing the said pusher to push the strap  $s$  forward, (see Fig. 10,) so that the front edge of the said strap will be projected between the cutter  $b$   $b'$  and opposed elastic surfaces  $b^2$ , to be hereinafter described, which perforate or slit the upper side of the paper tube covering the woven portion of the strap on the lines  $s'$   $s^2$ . (See Fig. 6.)

Upon the shaft  $a$  is a pulley,  $a^3$ , connected, by belt  $a^4$ , with a pulley at the end of the shaft  $a^5$ , (see Fig. 1,) which carries the tube perforating or slitting cutters  $b$   $b'$ , which perforate or slit the upper side of the tubular covering. These cutters are made as disks, provided with fine, sharp teeth like saws, these having about thirty teeth to the inch. These cutters are suitably clamped between roller-like collars, secured to the said shaft and nearly as great in diameter as the said cutters.

While the cutters  $b$   $b'$  perforate or slit the upper side of the paper tube the lower side of the said tube and the woven portion of the strap within the tube will be supported upon an



elastic roller-like support,  $b^2$ , (see Fig. 10,) on a short metallic or other sleeve placed upon a shaft,  $b^3$ , parallel with and below the shaft  $a^5$ , the two shafts being geared together by suitable pinions, one of which,  $b^4$ , is shown in Fig. 1. The under side of the paper tube, the upper side having been perforated or slitted, must also be perforated or slitted, and to do this I have arranged a shaft,  $b^5$ , at the side of, but in advance of, the shaft  $b^3$ , and have provided it with two tube perforators or cutters, one of which is shown at  $b^6$ , (see Fig. 10,) they being like the cutters  $b$   $b'$ , and so located as to operate upon and perforate or slit the under side of the tube transversely in exact line with the perforations or slits made by the cutters  $b$   $b'$ .

Co-operating with the cutters  $b^6$  on the shafts  $b^5$  are suitable elastic-surfaced rollers,  $b^7$ , on a sleeve on shaft  $b^8$ . The shafts  $b^5$   $b^8$  are geared together by suitable pinions  $c$   $c^x$ . (Shown at Figs. 1 and 9.) The shaft  $b^3$  has upon it a pinion,  $c'$ , which is made to engage a pinion,  $c^2$ , on the shaft  $b^8$ , which connection enables the shafts  $a^5$   $b^5$  to be moved in unison with the shafts  $b^3$   $b^8$ .

The devices which act to so perforate or slit the paper tube also act to feed it forward laterally between the two shafts,  $b^5$   $b^8$ , which carry the cutters  $b^6$  and elastic surfaces  $b^7$ , for perforating or slitting the lower portion of the paper tube while upon the woven portion or body of the strap. The strap, with its tubular covering perforated or slitted, as described, is delivered from between the last set of devices for perforating it upon a bed,  $h$ , (see Fig. 10,) and the said strap is held down thereon by the plate  $r$  until the succeeding strap is forced against and moves it laterally underneath the drawing-off devices  $h'$  40  $h^7$   $h^8$  and under the presser  $h^3$  and strap-folding blade  $l$ . The presser  $h^3$ , on the rock-shaft  $h^4$ , connected with the link  $h^5$ , actuated by a cam,  $h^6$ , on the shaft  $c^5$ , is then thrown down upon the strap between the perforated lines  $s'$   $s^2$  thereon in the paper, thus impinging the said strap and tubular covering about it firmly upon the bed  $h$ .

The upper members or partial rolls  $h'$  40 of the drawing-off mechanism are on spindles 2 3 in sleeves  $w^3$  pivoted at  $w^4$ , so as to rise and fall a little, as may be necessary to adapt the said rollers  $h'$  40 and rollers  $h^7$   $h^8$  on the shafts 4 5 to the thickness of the strap.

The shafts 4 5 carry pinions 6 7, which are engaged by racks 8 9, on reciprocating bars 10 11, connected by links 12 13, with two arms of a rock-shaft, 14, the said shaft having a third arm, 15, provided with a roll, 16, which rests upon a cam, 17, connected with the shaft  $a$ , the said cam turning the rock-shaft 14 and its arms to reciprocate the racks 8 9 and impart to the rolls  $h^7$   $h^8$  a partial rotation.

The studs or shafts 2 3, carrying the partial rolls  $h'$  40, have connected with them (see Fig. 3) pinions 18 and 19, and are partially rotated in unison with the shafts 4 5, but in opposite directions, so that the rollers  $h'$   $h^7$  and

40  $h^8$  are made to nip the portions  $s^3$   $s^4$  of the paper tube inclosing the woven part of the strap, (see Fig. 6,) and by their partial rotation pull upon the said tube outside the lines  $s'$   $s^2$  of perforations, and partially pull or draw-off the pieces  $s^3$   $s^4$ , as in Fig. 7, from the piece of woven material within the same. These ends  $s^3$   $s^4$  of the tube having been partially drawn off, the folder  $l$ , having preferably two or more needle-points, 20, (see Fig. 10,) to penetrate both the tube and woven portion of the strap—to thus obviate the strap moving longitudinally or the tube moving on the strap—is caused to descend upon the strap and fold and press it into and between the two elastic-surfaced folding-rollers  $m$   $m'$ . The folding-blade  $l$  is connected with the rocking-arm  $l'$ , having joined with it at one end a link,  $l^2$ , which is actuated by a suitable cam,  $l^3$ , on the shaft  $c^5$ . When the folding-blade meets the strap, the presser  $h^3$  is raised therefrom, but the drawing-off mechanism  $h'$ ,  $h^7$ , 40, and  $h^8$  yet hold firmly the portions  $s^3$   $s^4$  of the paper tube; but as the blade descends and the rollers  $m$   $m'$  draw the strap down between them and fold it, the woven part of the strap is drawn out from the small or short pieces  $s^3$   $s^4$  of the paper tube then held by the drawing-off devices, which latter are then moved sufficiently to discharge said pieces.

The roll  $m$  is secured to a shaft, 22, having at its end a pulley, 24, (see Fig. 3,) driven by a belt, 25, on a pulley, 26, secured to shaft  $c^5$ . This shaft 22 has a pinion,  $n$ , (see Fig. 1,) which engages with a corresponding pinion, 41, of the same size, on a loose sleeve, 23, (see Fig. 9,) upon which is secured the feed-roll  $m'$ , the said sleeve being mounted upon a stud, 28.

Just as the end  $s^3$  of the paper tube is partially pulled off, the pasting device  $o$ , connected with the rotary reciprocating shaft 2, is thrown downward from a position in contact with paste-applying roll  $o'$ , (see Fig. 9,) and applies a spot of paste, as at  $o^2$ , (see Fig. 7,) upon the woven or fibrous part of the strap, so that when the strap is folded together in the direction of its length by the folding-blade  $l$ , the paste will cause the two members or ends of the strap laid in contact to be held together.

The passage of the folded strap between the rollers  $m$   $m'$  set the paste and diffuse it across the fibrous part of the strap.

The paste-roller  $o'$  is supplied with paste from the roller  $o^3$  in the trough  $o^4$ .

The shaft  $o^5$ , upon which the roller  $o^3$  is secured, has at one end a small pulley,  $o^7$ , which is driven by a belt,  $o^8$ , extended about the pulley  $o^9$  on the shaft  $c^5$ .

The small belt  $p$ , (see Figs. 1 and 3,) extended from the roller  $o^7$  to and about the roller  $p'$ , drives the shaft  $p^2$  of the paste-roller  $o'$ .

The arm carrying the paster  $o$  is not connected rigidly with the shaft 2, but is held thereto frictionally in any usual way, as by being pinched between collars and nuts thereon, so that the shaft 2 may move a greater distance than the paster, the latter always



moving, however, far enough to come into operation at the proper time and transfer paste from the roller  $o'$  to the fibrous web composing the boot-strap.

5 The bearing-plate  $r$ , to prevent the strap  $s$  from rising as it is delivered from between the last set of perforating or slitting cutters and the elastic supporting-surfaces co-operating with them, (see Fig. 10,) has its rear end connected with the lug  $r'$  on the rod  $r^2$ .

10 In practice I prefer to place in the machine a spring-plate,  $t$ , (shown in Figs. 1 and 8,) to bear upon the combined paper tube and webbing just as it passes between the tube and webbing feeding mechanism  $e^4 e^5$ , the end of the said spring being provided with a slot, or being cut out so as to straddle the roller  $e^4$ , which is narrower than the flanged roll  $e^5$ . The roll  $e^5$ , being flanged, serves to guide the combined tube and webbing in a straight line.

20 The lower member or blade of the web-cutting mechanism, which co-operates with the blade  $f$ , is shown at  $u$ , Fig. 8.

In some instances it is desired to leave more of the web portion of the strap uncovered at one end than at its other end. To do this, it is necessary to adjust the web-cutting mechanism  $f u$  horizontally with relation to the position occupied by the perforating or slitting cutters. This I accomplish by loosening the thumb-screws  $t' t^2$  and moving the block  $t^3$  from which rises the vertical guide  $f^2$ . (See Fig. 8.) The cam  $f^4$  is at the same time adjusted laterally upon the shaft  $a$ .

35 The cylindrical surfaces  $w$  and cutters, will be made horizontally adjustable upon their carrying-shaft, so as to insure the proper length for the tube of paper to be left upon the folded boot-strap.

40 The delivery-tube in which the folded straps are passed from the rollers  $m m'$  is marked C.

The upward motion of the sleeves  $w^3$  is controlled by a suitable check-nut,  $x$ , on a rod,  $x^2$ , extended loosely through an ear,  $x^3$ , of the said sleeve. (See Fig. 10.)

45 I do not claim, broadly, any mechanism to fold paper about a piece of webbing to be cut into pieces of suitable length for boot-straps.

I claim—

50 1. In a machine for covering webbing, the following instrumentalities, viz: the feeding mechanism for the web of paper and the webbing to be covered by it, pasting mechanism, substantially as described, to apply paste to one edge of the web of paper, mechanism to form the pasted paper into a continuous tube with its edges lapped and held lapped by the paste, cutting mechanism to sever the webbing and paper tube into pieces of the proper length after the webbing has been inclosed in the paper tube, and folding mechanism to fold the same, substantially as set forth.

60 2. In a machine for covering webbing for boot-straps, a perforating-cutter to perforate transversely, as described, the webbing or

strap-covering pasted paper tube, in order that the end of the said tube may be drawn or pulled from the woven part of the boot-strap and leave its ends exposed, substantially as described.

3. The presser to act upon and hold the paper-covered boot-strap, combined with drawing-off mechanism to engage the pasted paper tube and pull on and detach its ends from the paper tube covering the central part of the boot-strap, substantially as described.

4. The pusher to move the paper-covered boot-strap laterally into position to have the paper tube perforated transversely, and the perforating-cutters and elastic supports between which the paper-covered strap is passed to perforate the paper tube at both sides, combined with a presser to hold the paper-covered strap in fixed position, and with drawing-off mechanism to pull or draw off from the woven part of the strap the ends of the paper tube, substantially as described.

5. The presser to hold the perforated paper-covered strap, and mechanism to automatically pull or draw the ends of the paper tube from its central portion, combined with a folding-blade and rollers to fold the strap transversely, substantially as described.

6. The folding-blade  $l$ , provided with the needle-points to penetrate the paper tube and strap, combined with the roller  $m m'$ , substantially as described.

7. The rollers  $h^7 h^8$ , and the partial rolls  $h'$  and 40, constituting the drawing-off mechanism, combined with means, substantially as described, to operate the said rolls and partial rolls, substantially as described.

8. In a machine for covering webbing, the following instrumentalities, viz: the feeding mechanism for the web of paper and the webbing covered by it, mechanism to form the paper into a tube and fold it about the webbing, pasting mechanism to paste one edge of the web of paper, cutting mechanism to sever the webbing and paper tube into pieces of the proper length after the webbing has been inclosed in the paper tube, and perforating mechanism to perforate the said paper tube transversely, in order that portion of it may be subsequently withdrawn to leave the woven part of the boot-strap uncovered.

9. The folding-blade, and folding rollers co-operating therewith to fold the paper-covered strap, and the pasting-roller  $o'$ , combined with the paster to apply paste to the boot-strap, preparatory to folding it transversely, substantially as described.

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

CHARLES BOYCE.

Witnesses:

G. W. GREGORY,  
BERNICE J. NOYES.