

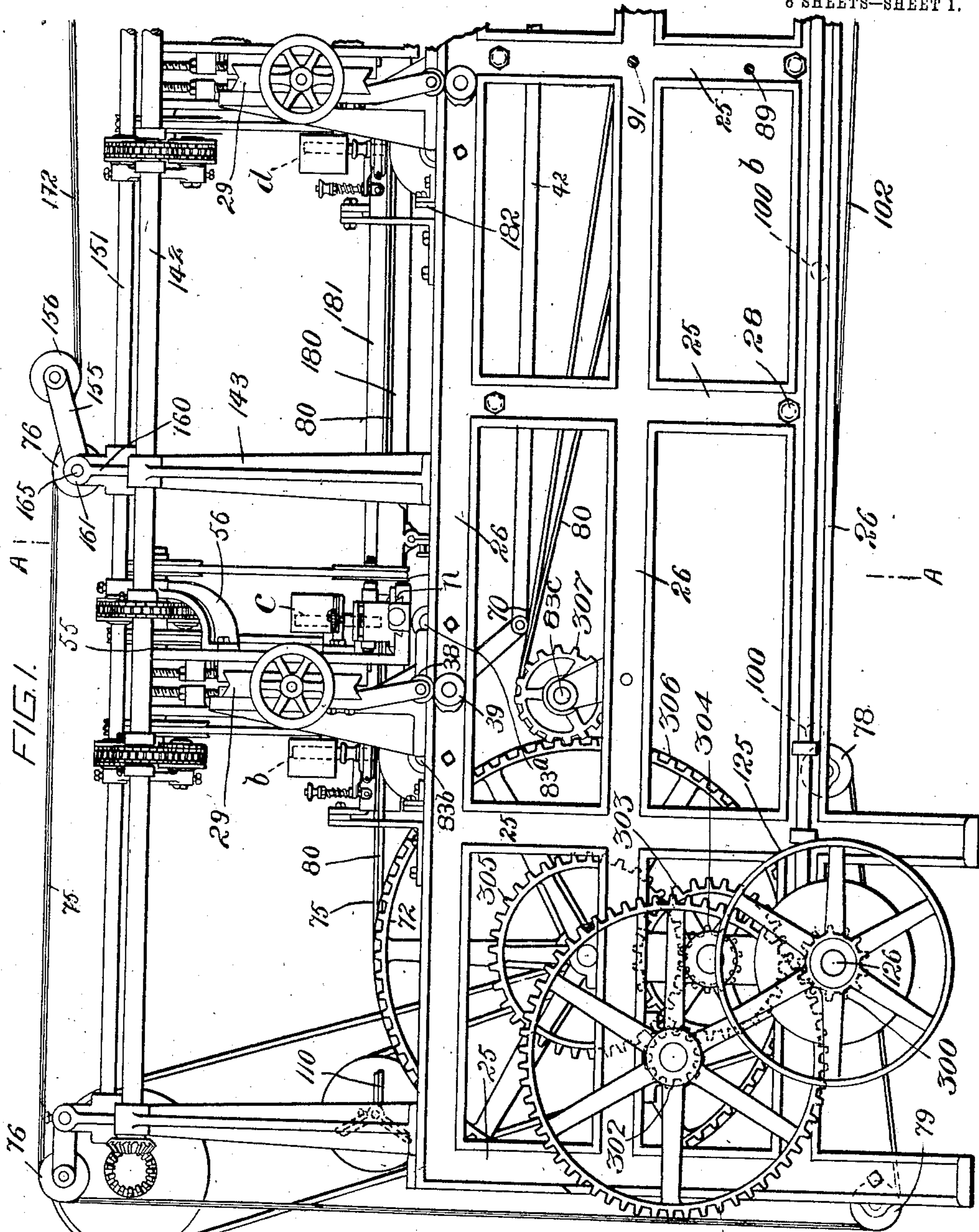
No. 830,612.

PATENTED SEPT. 11, 1906.

W. R. PHILLIPS.
BORDERING MACHINE.

APPLICATION FILED JAN. 12, 1905.

8 SHEETS—SHEET 1.



Witnesses

Alex. Currie.
J. H. Starr.

Inventor

William R. Phillips

By his Attorney

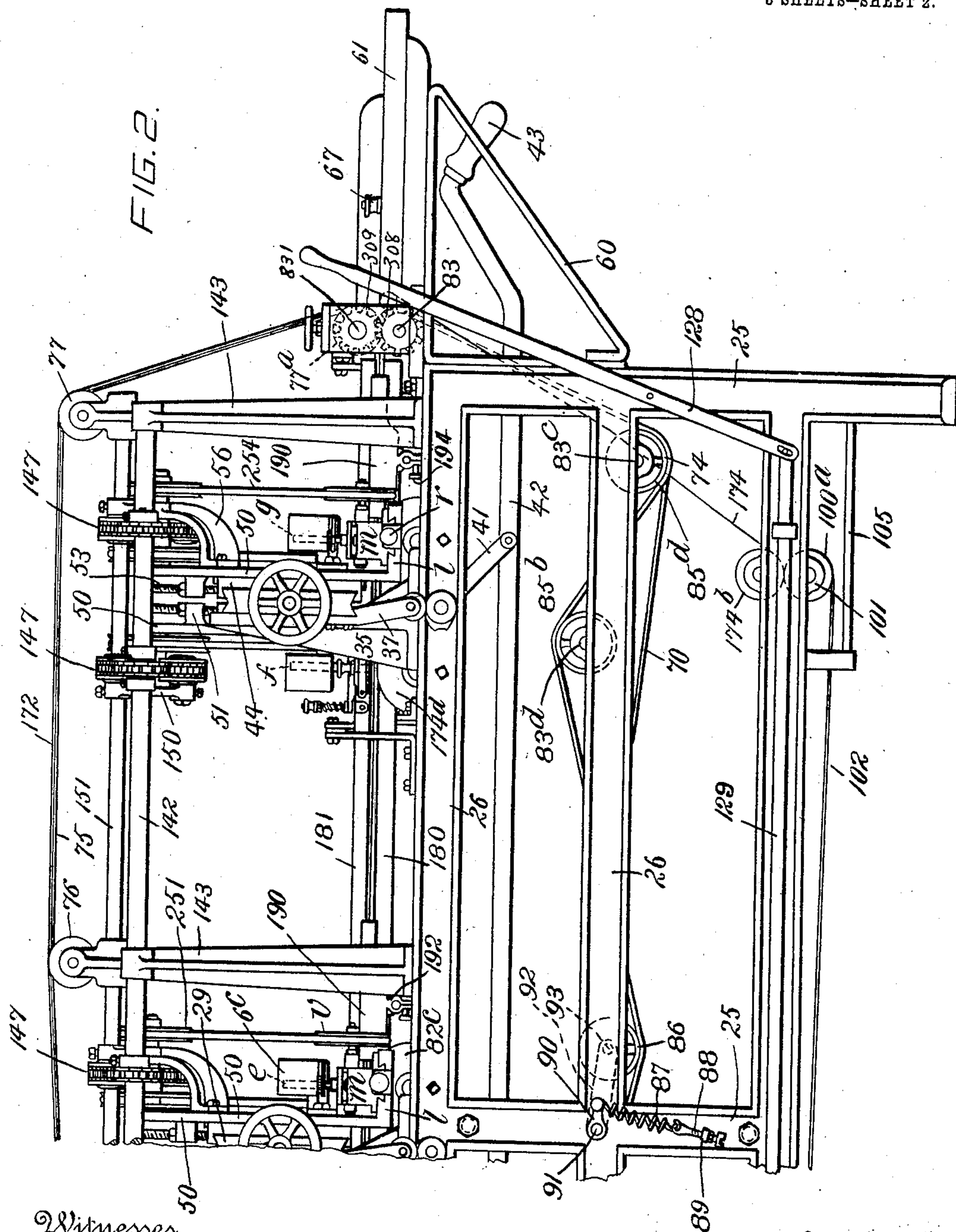
John H. Mann

No. 830,612.

PATENTED SEPT. 11, 1906.

W. R. PHILLIPS.
BORDERING MACHINE.
APPLICATION FILED JAN. 12, 1906.

8 SHEETS—SHEET 2.



Witnesses

Alex Currie.

Wm. J. Sears

Inventor

William A. Phillips

By *Wm*

Elkorneij

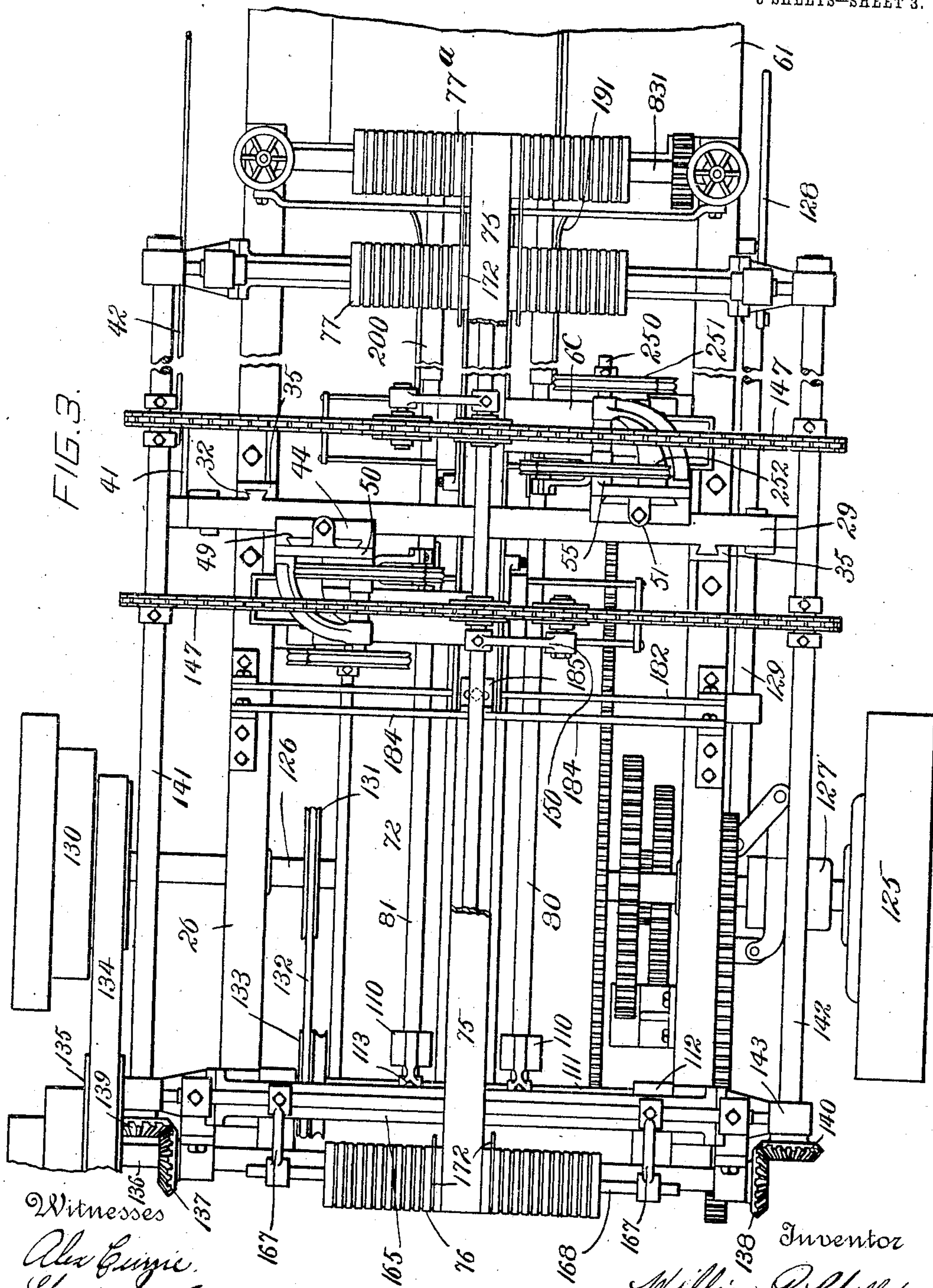
Attorney
John H. Hauer

No. 830,612.

PATENTED SEPT. 11, 1906.

W. R. PHILLIPS.
BORDERING MACHINE.
APPLICATION FILED JAN. 12, 1905.

8 SHEETS—SHEET 3.



Witnesses

Alex. G. G. G.
Fred. S. S.

By his

Attorney

Inventor

William R. Phillips

Attorney
O. W. H. H. H. H.

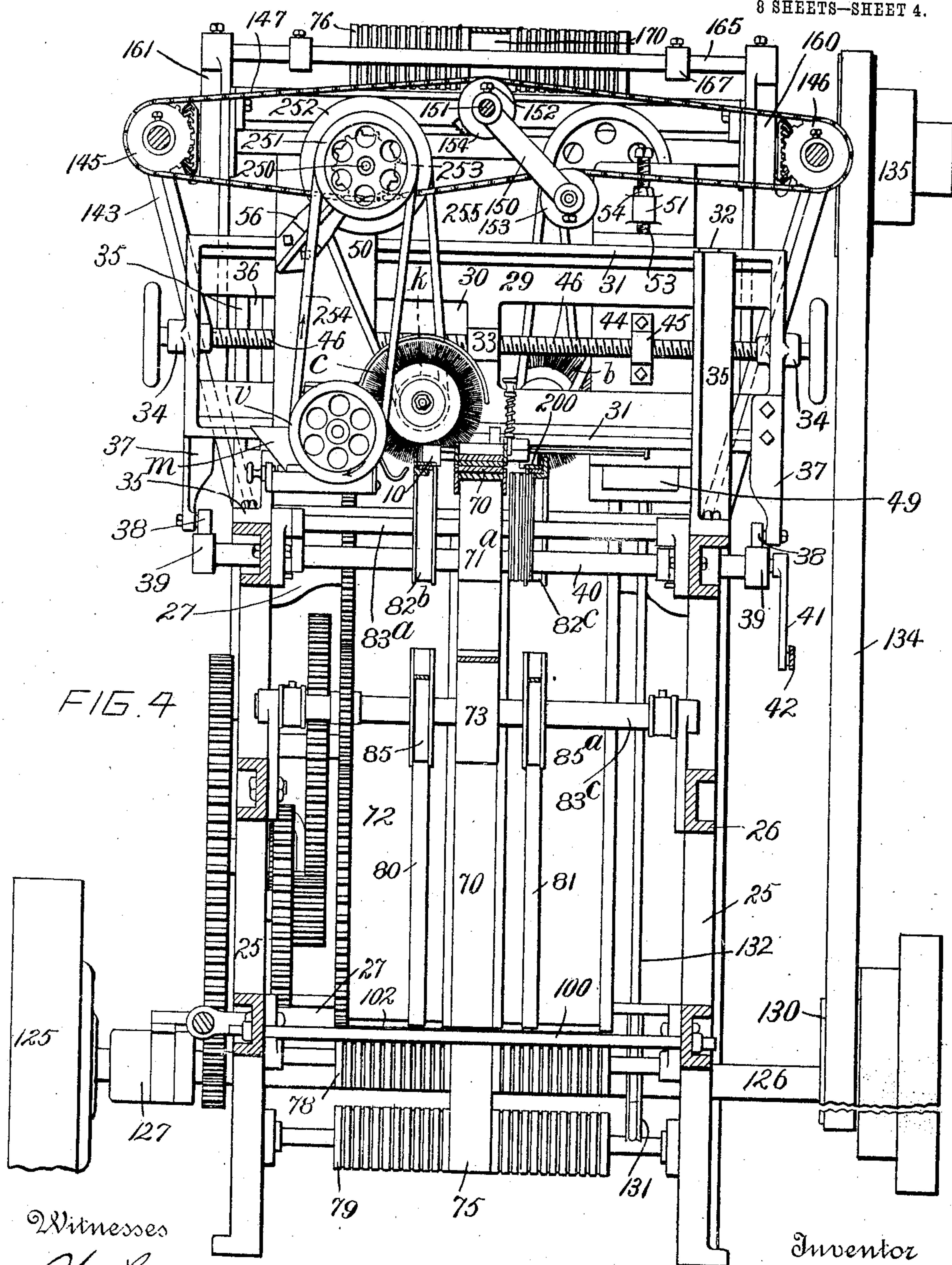
No. 830,612.

PATENTED SEPT. 11, 1906.

W. R. PHILLIPS.
BORDERING MACHINE.

APPLICATION FILED JAN. 12, 1905.

8 SHEETS—SHEET 4.



Witnesses

Alan Guyrie
Red Star

Inventor

William R. Phillips

By *his* Attorney

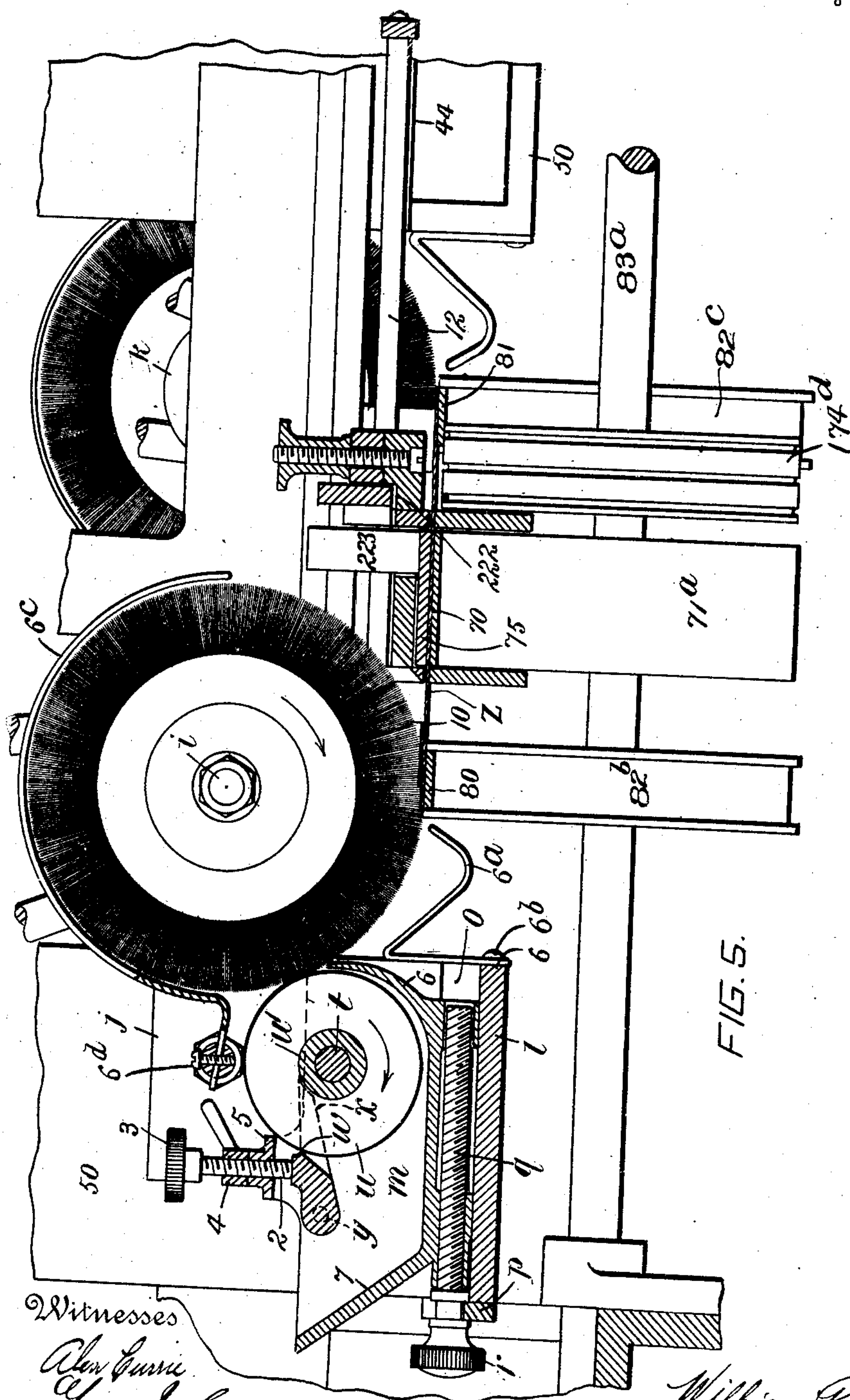
John W. Wane

No. 830,612.

PATENTED SEPT. 11, 1906.

W. R. PHILLIPS.
BORDERING MACHINE.
APPLICATION FILED JAN. 12, 1906.

8 SHEETS—SHEET 6.



Witnesses

Alon Currie
Clerk

Inventor

William R Phillips

By his

Attorney

Clara H. Trane

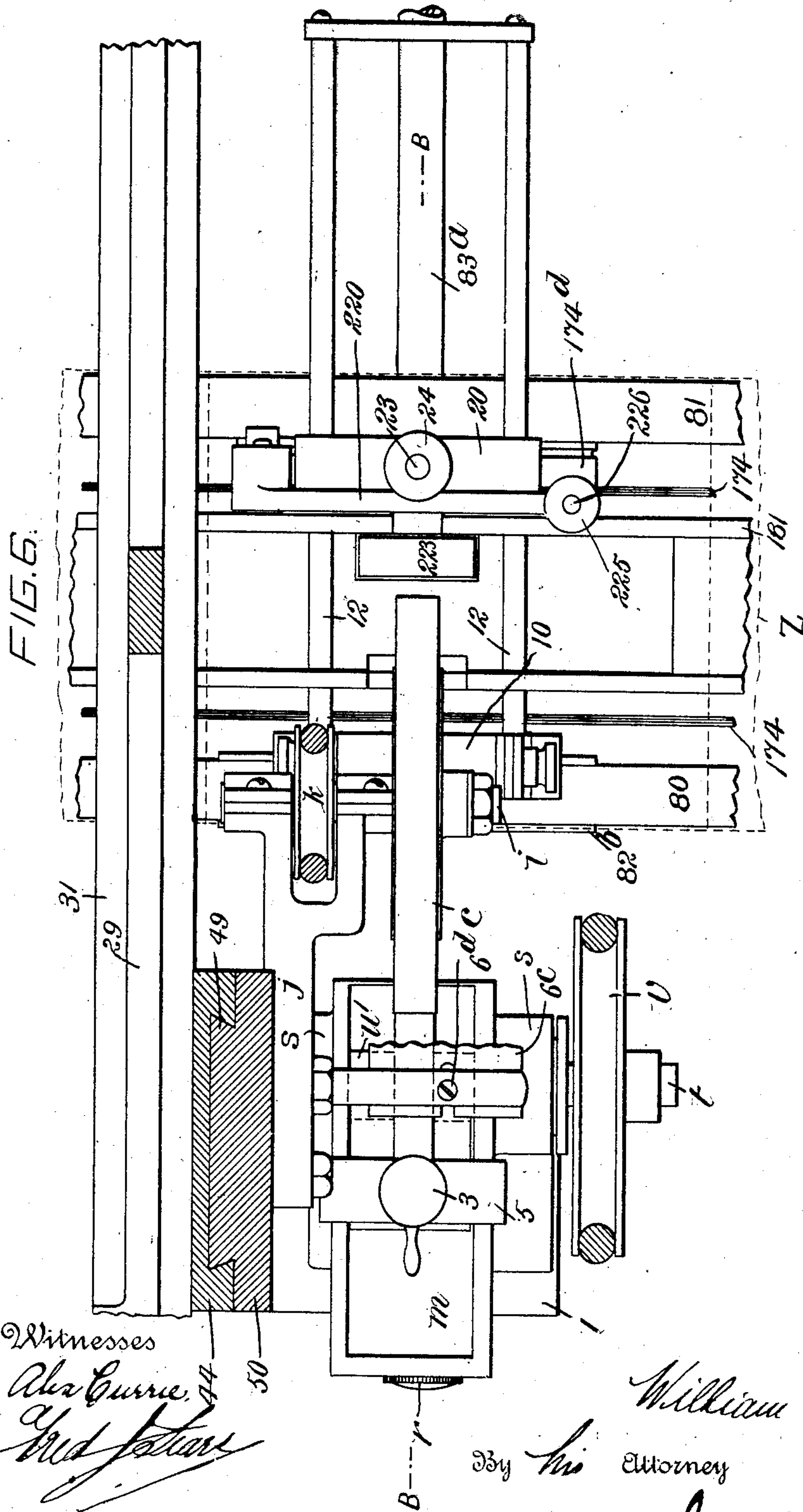
No. 830,612.

PATENTED SEPT. 11, 1906.

W. R. PHILLIPS.
BORDERING MACHINE.

APPLICATION FILED JAN. 12, 1905.

8 SHEETS—SHEET 6.



No. 830,612.

PATENTED SEPT. 11, 1906.

W. R. PHILLIPS.
BORDERING MACHINE.
APPLICATION FILED JAN. 12, 1905.

8 SHEETS—SHEET 7.

FIG. 7.

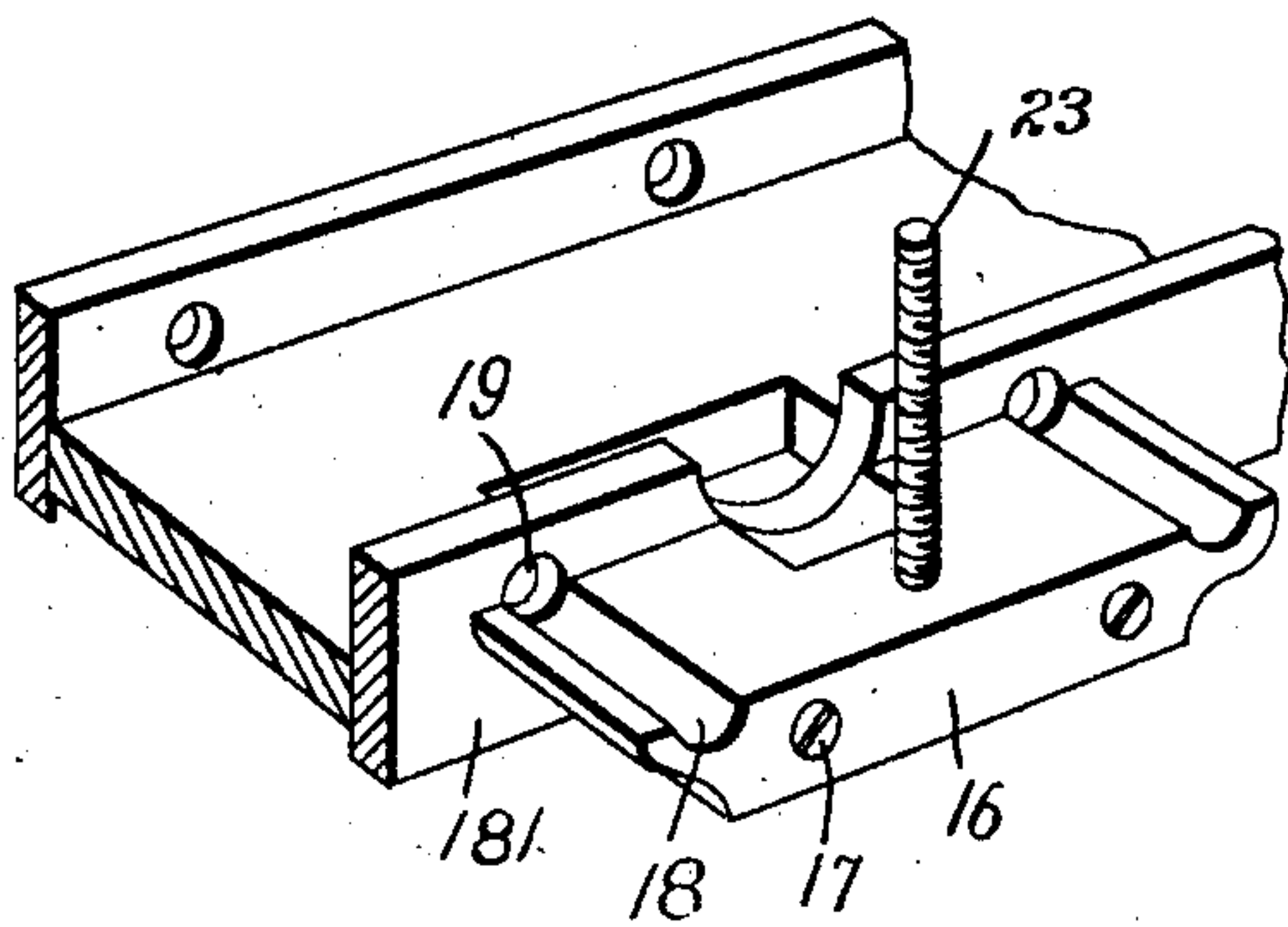


FIG. 8.

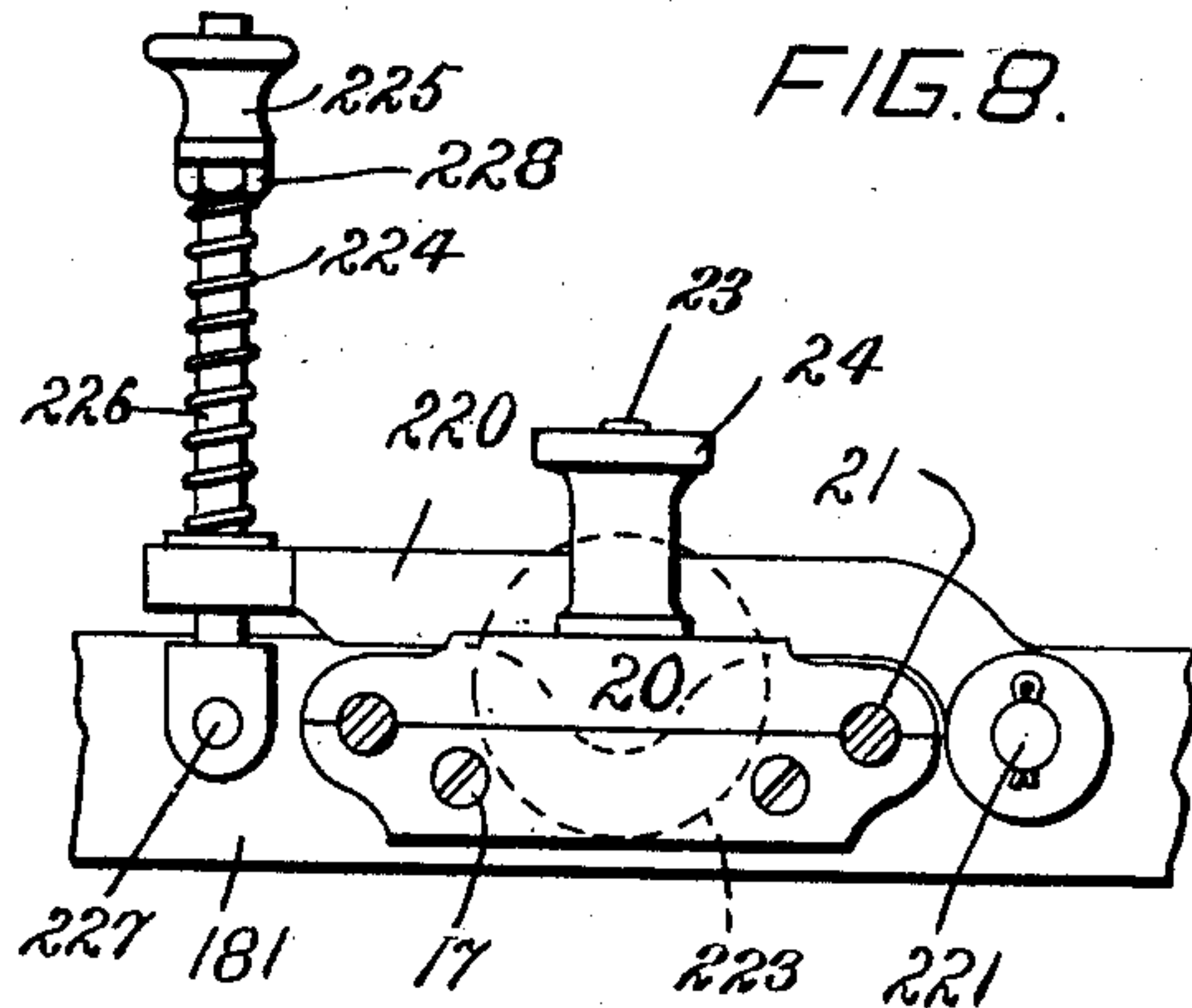


FIG. 9.

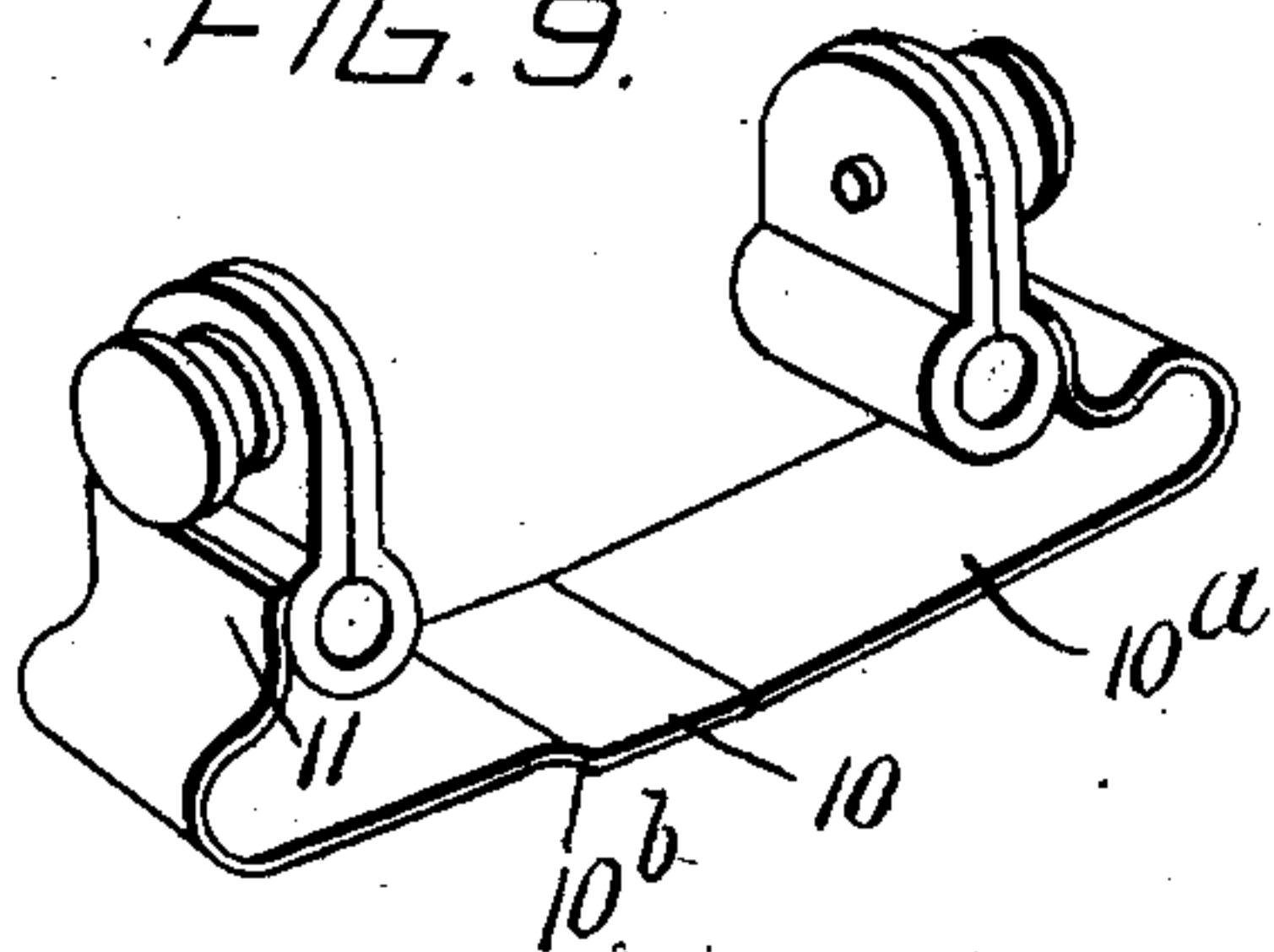
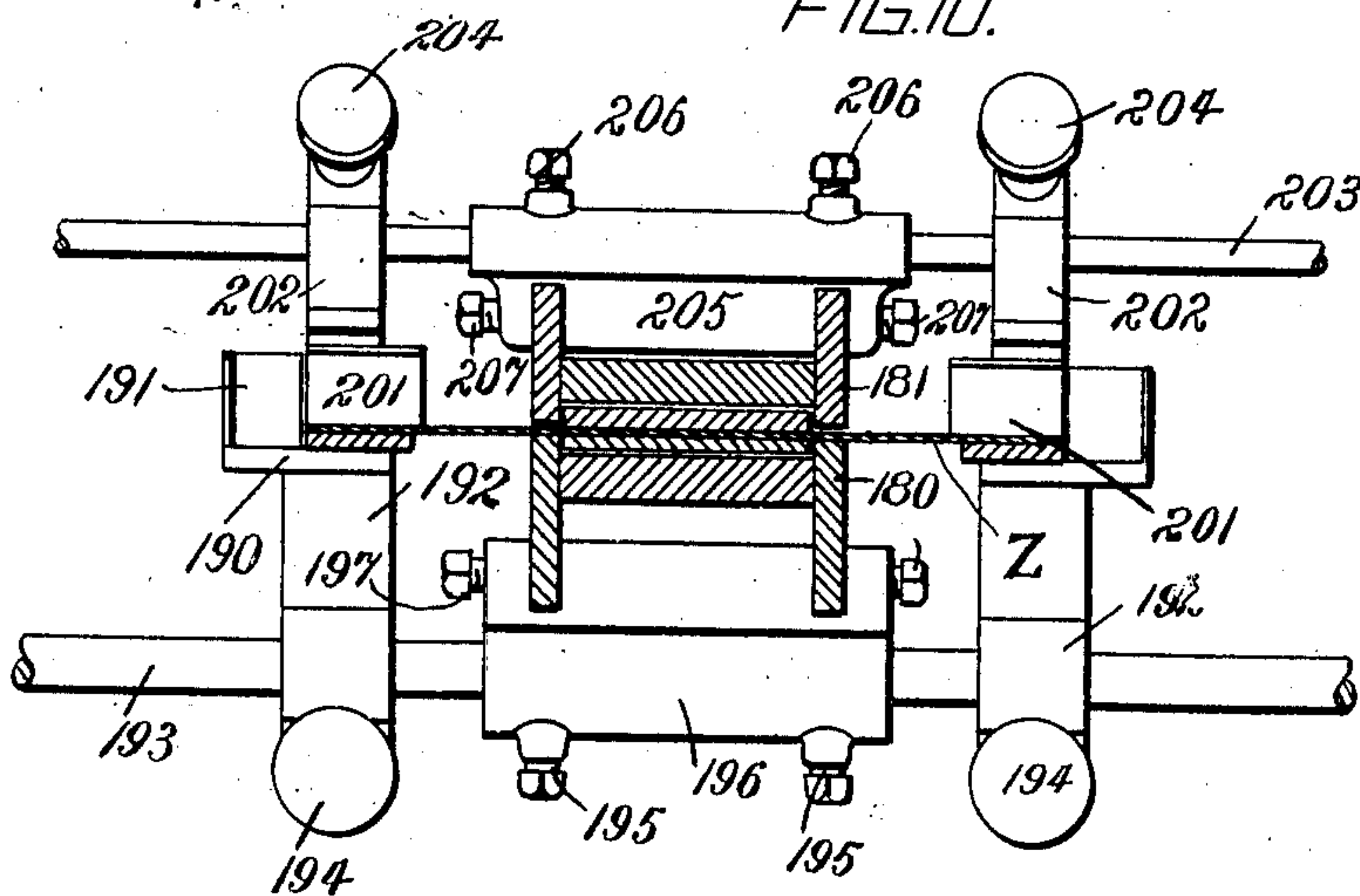


FIG. 10.



Witnesses

Alex. G. Gammie.
Chas. J. Starr

Inventor

William R. Phillips

By *his* Attorney

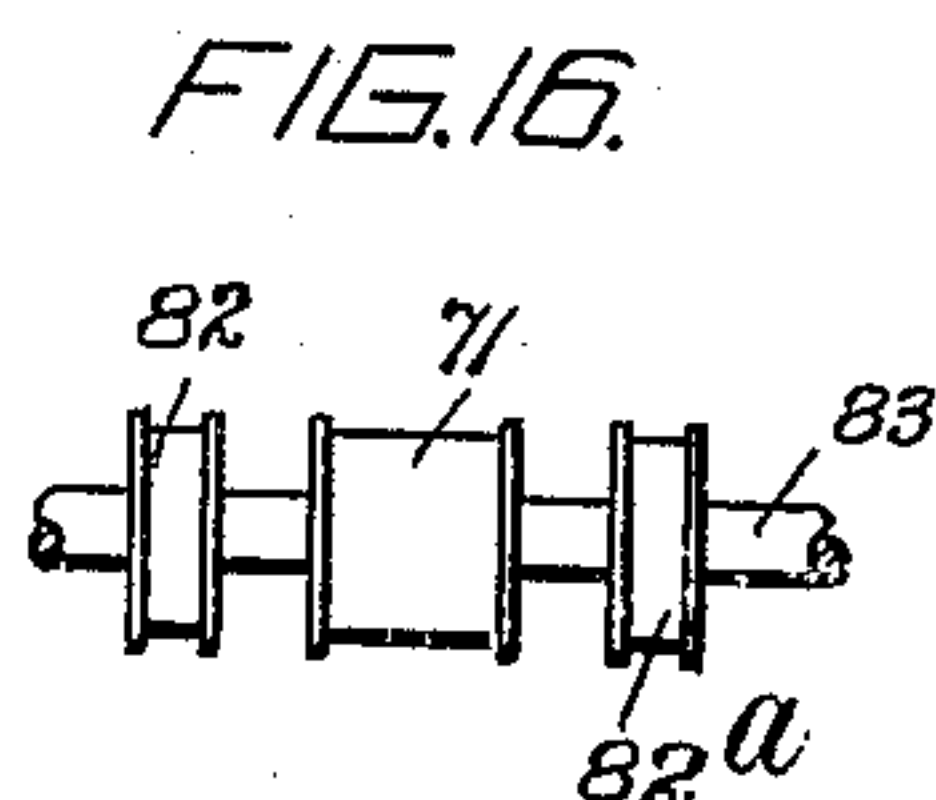
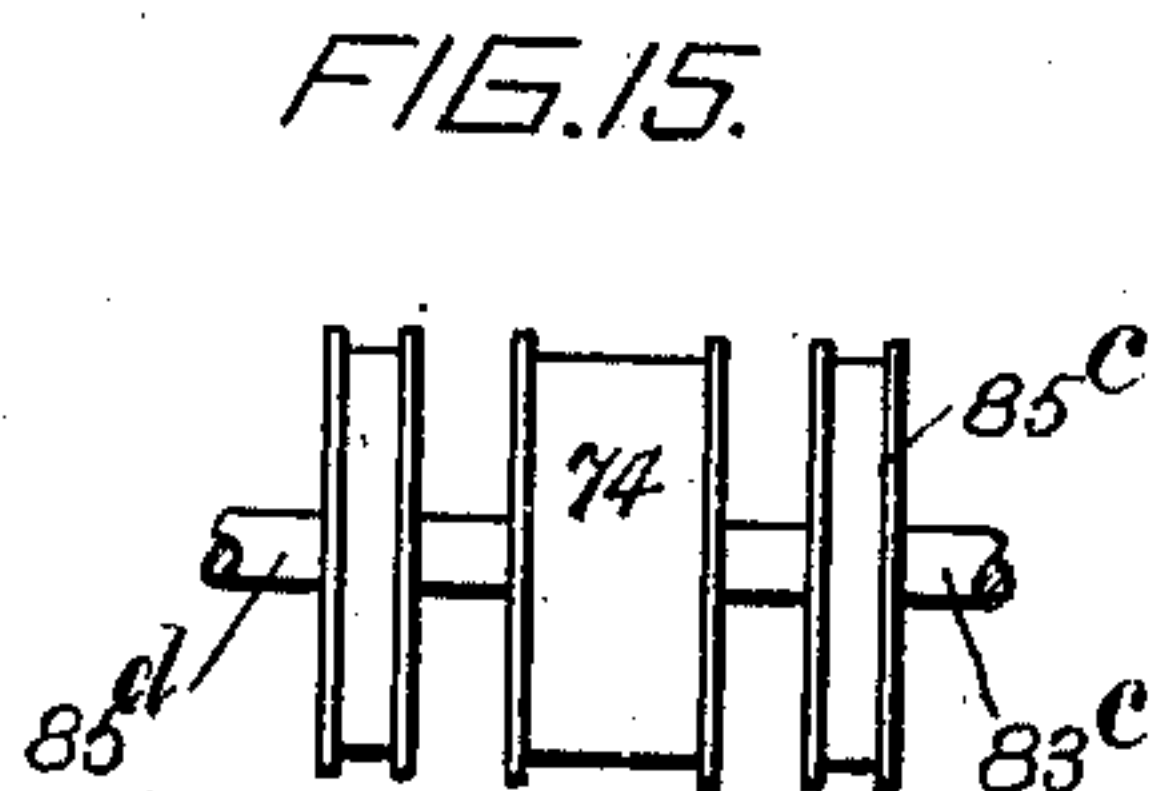
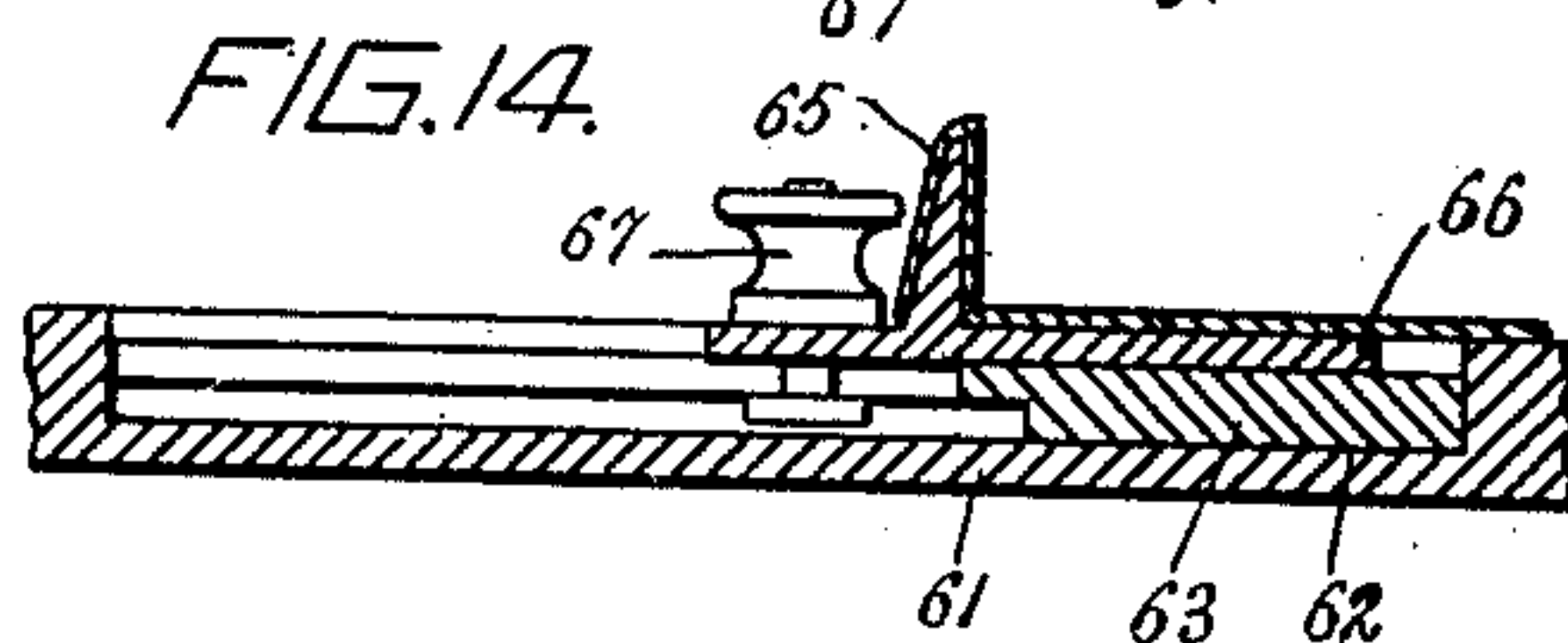
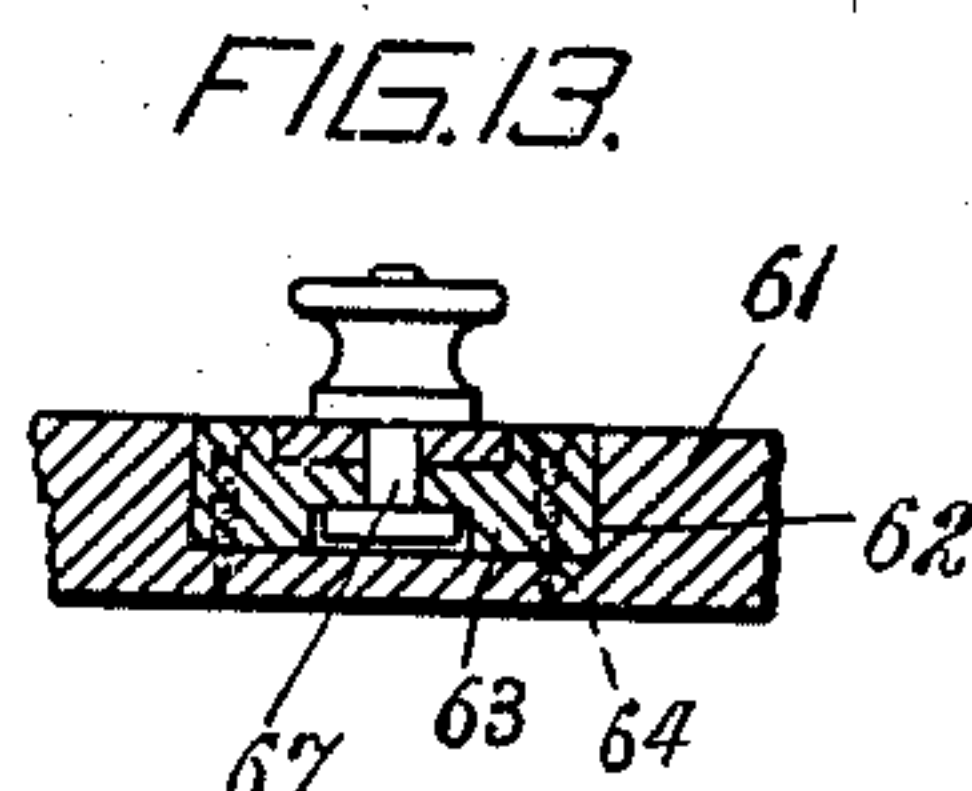
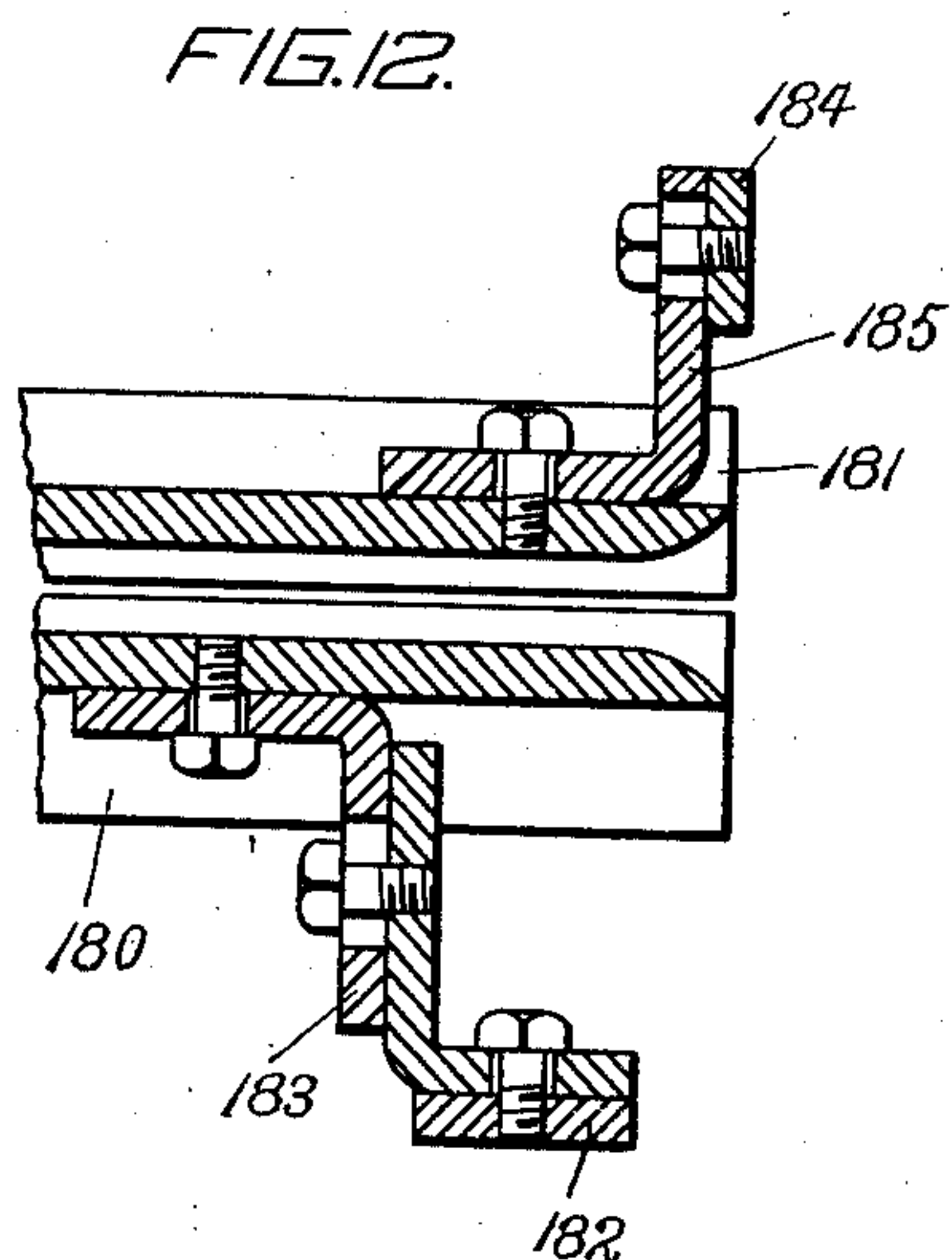
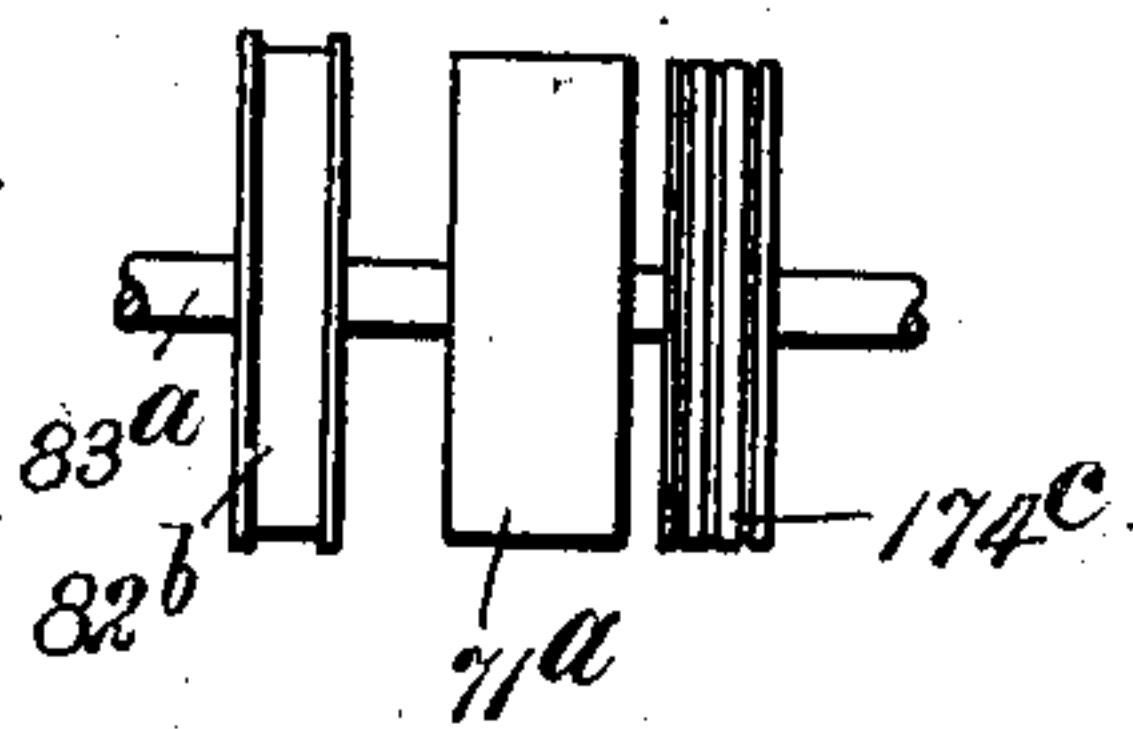
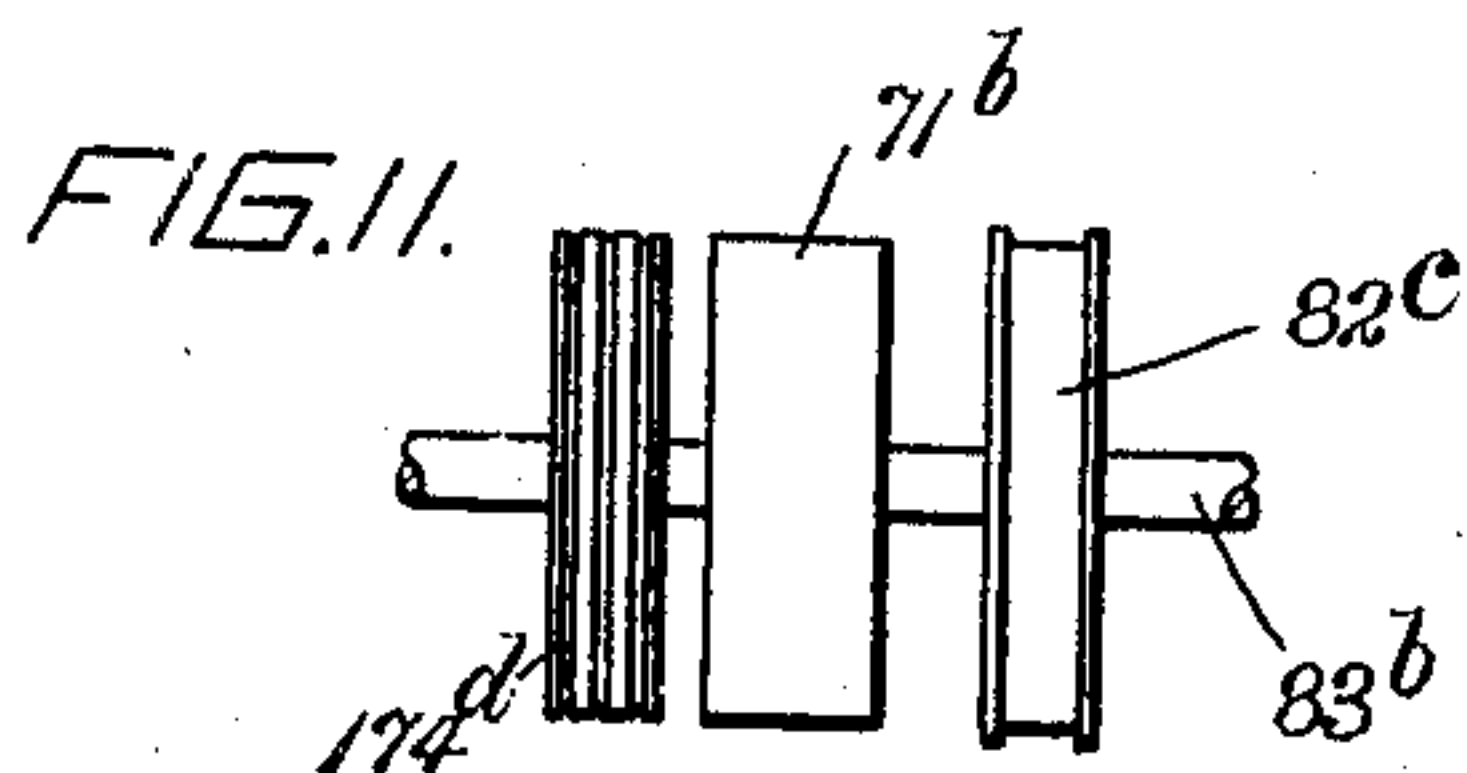
Oliver N. Wane

No. 830,612.

PATENTED SEPT. 11, 1906.

W. R. PHILLIPS.
BORDERING MACHINE.
APPLICATION FILED JAN. 12, 1905.

8 SHEETS—SHEET 8.



Witnesses
Alfred Currier
Wm. H. H. H. H.

William R. Phillips
Inventor

By Attorney
Wm. H. H. H.

UNITED STATES PATENT OFFICE.

WILLIAM RICHARD PHILLIPS, OF MONTREAL, QUEBEC, CANADA,
ASSIGNOR OF TWO-THIRDS TO ERNEST WILLIAM DAWSON AND
HAROLD GARDINER DAWSON, OF MONTREAL, CANADA.

BORDERING-MACHINE.

No. 830,612.

Specification of Letters Patent.

Patented Sept. 11, 1906.

Application filed January 12, 1905. Serial No. 240,839.

To all whom it may concern:

Be it known that I, WILLIAM RICHARD PHILLIPS, of the city of Montreal, Province of Quebec, Canada, have invented certain new and useful Improvements in Bordering-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates particularly to machines for use in applying a colored border to a surface, although it may be used with advantage in applying gum or other liquid substances to other portions than the border of a surface.

The invention has for its object to enable a greater amount of bordering or gumming and the like to be done in a given time and with greater uniformity than has been possible heretofore.

The invention may be said, briefly, to consist of a machine adapted to apply a liquid in one or more coats, as required, to a predetermined and defined portion or portions of a surface.

More specifically speaking, the invention consists of a gage (preferably adjustable) for defining the portion of the surface to be coated, means for applying the liquid, (whether coloring-matter, gum, or the like,) and means whereby the first-mentioned means is caused to apply a liquid to the defined portion of the article.

The preferred embodiment of my invention consists of endless conveying-belts adapted to convey the articles to be coated through one or more gaging devices which expose one or more portions thereof as they pass therethrough to the action of one or more rotary brushes fed with coloring-matter or gum, as the case may be, by one or more fountains, such conveying-belts being also adapted to convey the articles from the brushes through a drying-space to a suitable receptacle, while guiding devices position the articles relatively to the gages and brushes.

For full comprehension, however, of my invention reference must be had to the accompanying drawings, forming a part of this specification, in which like symbols indicate the same parts, and wherein—

Figure 1 is a side elevation of the rear half of my machine. Fig. 2 is a similar view of the front half. Fig. 3 is a plan view of the

machine with the middle portion thereof omitted. Fig. 4 is a transverse vertical sectional view taken on line A A, Fig. 1. Fig. 5 is an enlarged transverse vertical sectional view taken on line B B, Fig. 6. Fig. 6 is a horizontal sectional view of the parts illustrated in Fig. 5. Fig. 7 is a perspective view of a portion of the conveyer-belt-guiding devices and the gage-support. Fig. 8 is a side elevation of the means illustrated in Fig. 7. Fig. 9 is a perspective view of the gage. Fig. 10 illustrates the straightening means in end elevation. Fig. 11 is a plan view illustrating the relative position of some of the belt and cord rollers. Fig. 12 is a longitudinal sectional view of a portion of the front end of the belt-guides. Fig. 13 is a sectional view of a portion of the table, illustrating particularly the means whereby the table-guide is adjusted and set in different positions. Fig. 14 is a similar view of the same means and taken at right angles to Fig. 13; Figs. 15 and 16 show a plan view of portions of two of the shafts with the pulleys mounted thereon.

The main features of my invention are a series of vertically and horizontally adjustable fountain-fed rotary brushes *b, c, d, e, f*, and *g*, a series of gages 10 in conjunction therewith and adapted to define the space or spaces to be acted upon by the brushes, and a series of conveying-belts adapted to convey the articles to be coated across the space or spaces defined.

The brushes are similar in every respect, and the same can be said of the fountains for feeding them, the means whereby they are adjustably supported, and the gages, excepting that these combinations face alternately in opposite directions. I will therefore describe in detail one only of these combinations.

Each brush is of the well-known circular type, and it is mounted rigidly upon a shaft *i*, supported in a forked bracket *j*, bolted to a plate 50, to be presently described in detail, while a pulley *k* is also mounted rigidly upon this shaft between the prongs of the fork. The fountain is also carried upon this plate 50 (the lower end whereof has a laterally-projecting flange or foot *l* to support it) and consists of a dish *m*, having a dovetail *n* upon its under side and slidably located in a dovetail-guideway *o* in the foot *l*, a bearing *p* being secured to one side of the foot and localizing a

rotary screw-bolt *q*, threaded into a tapped perforation in the under side of the dish and having a knurled head *r*. By this means the fountain is adjusted toward and from the brush for purposes of fitting.

A pair of bearings *s* are formed one in each of the opposite side walls of the fountain, and a shaft *t* is rotatably mounted therein and has secured rigidly thereon a fountain-roller *u*, adapted to distribute the liquid it picks up from the fountain-dish over the brush, and a pulley *v* is also mounted thereon, whereby the fountain-roller is rotated, the fountain-roller itself being slightly narrower than the brush in order to prevent the brush receiving too much of the liquid from the fountain. A device for causing the liquid to be distributed evenly over the roller and for varying the amount fed to the brush consists of a forked scraper the crotch whereof is ground to a knife-edge *w*, while its prongs *x* are adapted to straddle the roller and clean the side thereof and when the fountain is idle to rest upon the hubs *u'* thereof and be supported in working position. This device is pivotally supported upon a pair of screws *y*, projecting inwardly through the side walls of the fountain and engaging in sockets in each end of the rear side of such device, which is thickened and rounded for the purpose, while its upward movement is limited by a screw *2*, having a knurled head *3* and adapted to have the said device bear upon its lower end, thereby enabling the adjacency of its knife-edge to the face of the roller to be regulated and the amount of liquid fed from the fountain to the brush to be varied or liquids of different consistency to be accommodated. The screw is supported in a bracket *5*, carried by the fountain, and it is locked in any position to which it may be moved by lock-nut *4*. The side of the fountain adjacent to the brush is curved, as at *6*, to partially encircle the roller *u*, and the opposite side is outwardly inclined, as at *7*, (as is usual in ink-fountains,) to facilitate the introduction of the liquid.

In order to catch any splashing from the brushes while they operate, I secure a pocketed guard *6^a* to the side *6* of each foot *l* by screws *6^b*, by loosening which such guard can be removed and emptied or cleaned. I also for the same purpose secure a semicircular guard or splasher over each brush, consisting of a curved plate *6^c*, having one end bent and passed through a slot in the projecting end of the stud which secures the bearing-bracket for the brush in place, such plate being held in place by a set-screw *6^d*.

Each gaging device utilized in conjunction with the fountain-fed brush consists of a metallic strip *10*, clamped at its ends, as at *11*, to the corresponding ends of a pair of rods *12*, the opposite ends whereof are held adjustably in a block *16*, to be presently further alluded to, these rods and the strip *10*

constituting an adjusting-frame whereby the strip *10*, which is the gaging instrumentality proper, is adjusted toward and from the axial plane of the brush. These clamps *11* enable the strip *10* to be adjusted to bear with varying degrees of tension upon the paper being acted upon, which adjustment is effected by loosening the clamps and turning them either toward or away from one another, according to whether it is required to make the strip bear with greater or less friction.

Each of the strips *10* is formed with the portion *10^a* thereof (which receives the article to be coated beneath it as it is being conveyed through the machine) curved gently upward from that edge of the brush to facilitate the entry of the article beneath it, while the portion at the opposite side of but contiguous to the brush is formed with a sharp rise, thereby forming a shoulder *10^b*, against which the brush rubs and prevents the collection of the liquid substance upon this strip *10* at a point where the article is likely to drag it and smear the work. The strips *10* are caused to bear tightly upon the work by the brushes, thereby clearly defining and forming a clean-cut edge of the portion of the article acted upon. This frame is adjustably supported in a bracket secured to the upper guide *181* (to be further described) for the central conveyer. There are a series of these brackets and they are disposed to support the gages adjacent to the brushes at the sides thereof opposite to the fountains and in positions to define or limit to a variable extent the areas acted upon by the brushes. Each of these brackets consists of the block *16*, secured by screws *17* to the guide *181* and formed with a pair of semicircular grooves *18*, which register with a pair of holes *19* in the guide, while a capping-plate *20* is formed with a pair of semicircular grooves *21* (corresponding to the grooves *18*) in its under side and a perforation which fits over a screw-bolt *23*, carried rigidly by the block *16*, to which latter the capping-plate is clamped by means of such screw-bolt and a nut *24*. The rods of the frame lie in the grooves of this bracket, and by loosening the nut *24* such frame can be moved and the gage adjusted and set in any desired position relatively to the brush.

In order that the conveyers and the means for mounting and operating the same and the means for mounting and operating the brushes and their fountains may be clearly understood, I will first describe the machine-frame I prefer to use, although such frame can be changed without departing from the spirit of my invention. The base of my machine-frame consists of a pair of side frames, each comprising a series of vertical members *25* and horizontal members *26*, such side frames being secured together by transverse flat members *27* and round bars *28*. This

base-frame has a series of vertically-adjustable transverse horizontal carrying members mounted thereon, each of which carries a pair of the rotary brushes and their operating-gear, a pair of the fountains, and means for vertically and horizontally adjusting the brushes and fountains relatively to the carrying members. These carrying members are similarly constructed and supported, and I will therefore describe one only. An oblong web 29 is provided with openings 30 to reduce its weight and is formed on the opposite sides of its top and bottom edges with oppositely-projecting diagonal flanges 31, one side of each end being thickened and formed with a dovetail 32, while the central portion of the web and the ends thereof are formed with sleeves 33 and 34 in line with one another. The dovetails 32 fit slidably in a pair of brackets 35, bolted to the top of the base-frame, each having a longitudinal dovetail-guideway 36 to receive such dovetails 32.

A pair of depending arms 37, bolted at their upper ends one to one side and adjacent to one end of the web and the other to the opposite side adjacent to the opposite end, have trundle-rolls 38 thereon, which rest upon a pair of cams 39, mounted rigidly upon an oscillatory shaft 40. This shaft is moved manually and rotated in one direction or the other when it is required to raise or lower it by an arm 41, mounted rigidly upon one end thereof, the arms, last mentioned, upon the shafts (there being three, one for each pair of brushes) being pivotally connected at their lower ends to a common bar 42, having a handle 43, by which it and the arms may be moved and the shafts, and with them the cams mounted thereon, rotated, thus raising or lowering the webs and the parts carried thereby. Each of these webs has a pair of dovetailed plates 44 fitted thereon, each having a tapped collar 45 upon its inner side in line with the sleeves 33 and 34, such plates being adapted to be slidably adjusted to and fro along their carrying-webs transversely to the machine by means of a pair of screws 46 46, mounted rotatably in the sleeves 34 34, with their ends loosely socketed in the opposite ends of sleeve 33, while the said screws are screw-threaded through the tapped collars 45, thus effecting an operative connection between the screws and the plate 44, whereby the latter can be adjusted, as above mentioned. Each of these dovetail plates has a longitudinal dovetail-groove 48 in its outer side which receives a dovetail 49 upon the lower portion of the rear of the plate 50, (before mentioned,) which also has a tapped sleeve 51, mounted rigidly upon the upper portion of its rear side in line with the portion of the plate 44 immediately in rear of the dovetail 49. These plates 50 are raised and lowered relatively to the plates 44 for the purpose of adjusting the fountain-fed

brushes relatively to one another by screws 53, threaded through the sleeves 51 and bearing upon the top of the plates 44. Jam-nuts 54 prevent displacement of the screws 53 after they have been adjusted. Each of the plates 50 is perforated at one corner and formed with a perforated boss 55, a bearing-bracket 56 being bolted thereto with its bearing end in line with the perforated boss 55. These brackets, however, form a part of the driving mechanism hereinafter fully described.

A feeding-table is supported upon brackets 60, bolted to the front end of the frame, and consists of an oblong plate 61, having in its top an oblong recess 62, extending transversely of the machine. A recessed plate 63 is secured in this recess, preferably by screws 64, and the tongue 65 of a guiding-plate 66 is slidably secured in this plate by cap-screws and clamping butterfly-nuts 67, with the guiding-plate longitudinally to the machine. The articles to have portions of their surfaces coated are positioned relatively to the fountain-fed brushes by means of this guiding-plate, which is previously adjusted for the purpose.

The means for conveying the articles to be acted upon from the table to the brushes and then to the receptacle consists of a series of belts, preferably as follows, some for supporting the articles and others for preventing the displacement thereof relatively to the supporting-belt.

The number of belts utilized depends upon the width of the sheet or other article to be acted upon. The machine illustrated is particularly adapted for use in bordering newspaper and a margin around the edge of envelopes for the production of mourning goods, and I will, therefore, describe a conveyor for this purpose.

A main supporting-belt 70 is looped over a pulley 71 and a series of pairs of supporting-rollers 71^a 71^b, respectively, around a driving-drum 72, over a pulley 73, and around a pulley 74, back to pulley 71 again. A belt 75, coacting with this main supporting-belt and retaining the sheets against displacement, is looped upon a series of supporting-rollers 76, around a pair of pulleys 77 and 77^a, respectively, with belt 70 over rollers 71^a 71^b and the drum 72 and then separating from the belt 70 and running over a pair of pulleys 78 and 79 to the supporting-rollers 76 again. A pair of auxiliary supporting-belts 80 and 81 coact with the belt 70 and are located one at each side thereof. These auxiliary belts are looped over a pair of pulleys 82 and 82^a, mounted adjustably upon the same shaft (indicated at 83) as the pulleys 71, and they run over a series of pairs of supporting-rollers 82^b and 82^c, adjustably mounted, respectively, upon the shafts 83^a and 83^b upon which the respective rollers 71^a and 71^b are

mounted, then around the drum 72 and over a pair of pulleys 85 85^a, adjustably mounted upon the same shaft (indicated at 83^e) as the pulley 73. They run under a pair of tension-pulleys 86 86^a, over a pair of pulleys 85^b and 85^c, (mounted adjustably upon a shaft 83^d,) and under a pair of pulleys 85^d and 85^e, mounted adjustably upon the same shaft (indicated at 83^e) as the pulley 74, and back to pulleys 82 82^a.

The tension-pulleys 86 86^a are caused to bear with varying degrees of tension upon the auxiliary belts by means of a spring 87, secured at one end to the upper end of a vertical bolt 88, mounted slidably in a bracket 89, projecting outwardly from the machine-frame. The upper end of this spring is connected to a crank-arm 90 upon one end of a shaft 91, which has a pair of bracket-arms 92 mounted rigidly thereon and carrying rotatably in its outer ends a shaft 93, upon which the tension-pulleys 86 86^a are adjustably mounted.

The pulleys 76^a, 77, 77^a, 78, and 79 and the roller 76 are elongated and grooved, and a pulley 100 of smaller diameter (to enable it to be located adjacent to the pulley 78) is rotatably mounted in the frame of the machine, and a groove-pulley 100^a is rotatably mounted in brackets 101, secured to the frame, while a series of cords 102 are looped around such latter pulleys and lie in the grooves therein and are adapted to act as auxiliary conveyers and receive from the conveying-belts proper the sheets of note-paper which have been acted upon and convey them to and drop them upon a platform 105, bolted to the frame of the machine. These cords are prevented from sagging at their upper level by an elongated grooved roller 100^b.

A pair of rotary fans 110 are mounted loosely upon a counter-shaft 111, supported in bearings 112, carried by the frame, such fans being adjustable along the shaft and rigidly secured in any position to which they may be adjusted by set-screws 113. The function of these fans is to dry the substance spread upon the sheets of note-paper or other articles as they pass from the last pair of brushes to the platform 105 or other receptacle for the purpose.

The belts 70 and 75 as they travel from the feeding-table to the drum are guided and kept in a straight line by a pair of guides constituted by a pair of lower and upper channels 180 181, the former, 180, being supported by a series of cross-bars 182, carried by the frame and to which such channels 180 are secured by brackets 183, adjustable for the purpose of accommodating different thicknesses of belts. The upper channel or guide is also supported by a series of cross-bars 184, to which they are connected by a bracket 185, adjustable to accommodate different thickness of articles being conveyed.

The means for operating the brushes, fountains, conveyers, and fans consist of a driving-pulley 125, mounted loosely upon a main drive-shaft 126 and adapted to be rotatively connected thereto by means of a clutch 127, operated from the front of the machine by means of a lever 128 and a link 129. Upon the opposite end of this shaft is rigidly mounted a flat pulley 130 and a grooved pulley 131, the latter being connected by a belt 132 to a double-grooved pulley 133, mounted rigidly upon the shaft 111 and imparting rotation to the fans. The pulley 130 is connected by a belt 134 to a pulley 135, mounted rigidly upon a shaft 136, upon which are also rigidly mounted a pair of bevel-gears 137 and 138, intermeshing with a second pair 139 140, mounted rigidly upon a pair of counter-shafts 141 and 142, rotatably supported in a series of pedestal-bearings 143, bolted to the top of the machine-frame. Each of these last-mentioned counter-shafts has, preferably, six sprocket-wheels thereon, three, 145, being rigidly mounted thereon and three, 146, loosely, such tight sprocket-wheels alternating with the loose ones, and the sprocket-wheels tight upon one shaft being in juxtaposition with the wheels mounted loosely upon the other shaft, and a series of chains 147 rotatively connect the tight sprocket-wheels with their loose opposite companions. Each of these chains passes beneath one of the sprocket-wheels 253 upon the shafts 250 and imparts rotation thereto in the direction indicated. Of each pair of brushes each brush is caused to rotate in an opposite direction to the other.

In order to cause the lower portion of each chain to make good connection with the sprocket-wheel 253, I mount a series of arms 150 adjustably upon a shaft 151 and secure the same rigidly in any desired angular position by means of set-screws 152. The free ends of these arms carry flanged rollers 153, adapted to raise the lower portion of the chain to effect such good connection, and a second series of flanged rollers 154, mounted loosely upon the shaft 151, keep the upper portion of the chains from wearing upon such shaft. Similar arms 155, with antifriction-rollers 156 thereon, are provided for tightening the belts 75.

Each of the pedestal-bearings 143 (seen clearly in Figs. 1 and 2) is laterally outwardly inclined relatively to the frame of the machine and formed with a vertical arm 160, having a bearing 161 at its upper end. They are arranged in pairs oppositely, one at each side of the machine, and besides supporting the counter-shaft 136 each pair supports between them in their bearings 161 one of a series of transverse counter-shafts 165, each (excepting that at the rear of the machine) having in the center thereof a groove on one of the rollers 76 (before mentioned) for sup-

porting the upper portion of the endless belt 75 for retaining the articles upon the main conveying-belt 70. The transverse counter-shaft at the rear of the machine is mounted rigidly in its supporting-bearings and has a pair of bracket-arms 167 secured rigidly thereon and rotatably supporting at its outer ends a counter-shaft 168, upon which the rearmost supporting-roller 76 is mounted. The rollers 76, 76^a, 77, 77^a, 78, and 79, each formed with a wide central recess 170 to accommodate the belt 75 and the series of grooves before mentioned to accommodate at times a series of cords 172, adapted to run with the belt 75 and augment the same in retaining the article against displacement upon the main conveying-belts. The main supporting-belts are augmented by a series of cords 174, looped over a series of grooved pulleys 174^a and 174^b, such cords being prevented from sagging by a series of pairs of grooved rollers 174^c and 174^d, mounted adjustably upon the shafts 83^a and 83^b, respectively. These cords may be dispensed with when comparatively narrow sheets or other articles are to be acted upon, or flat belts can be substituted therefor, if desired. When these cords 174 are not required, they are all moved into a single groove of each of the pulleys 174^a 174^b and the rollers 174^c and 174^d in order to move them out of the way.

The sheets, envelops, or other articles carried by the belts from the feeding-table are straightened before they are acted upon by the brushes by a series of guides, one located adjacent to and in front of each pair of brushes. Each of these guides consists of a pair of angular castings 190, flared at their front ends, as at 191, to facilitate the entrance of the article to be acted upon and formed with a depending split shank 192, whereby it is adjustably clamped upon a rod 193 by means of a clamping-screw 194. Each of these rods 193 is rigidly secured by screws 195 in a sleeve 196, fastened by screws 197 to the flanges upon the under side of the lowermost belt-guide 180. The horizontal flanges of these guides 190 have the auxiliary belts 80 and 81 riding thereon.

The articles being conveyed are prevented from rising from the belts as they pass through the guiding and straightening devices 190 by a series of yielding presser devices. Each of these devices consists of a resilient plate 200, having its front end curved upwardly, as at 201, and secured rigidly to a split clamp 202, adjustably attached to a rod 203 by a clamping-screw 204. The rod 203 is mounted in a sleeve 205 and secured rigidly therein by a pair of set-screws 206, while the sleeve 205 is fitted upon the flanges of the uppermost channel or guide 181 by screws 207.

By loosening the screw 204 the clamp can be adjusted around its carrying-rod, thereby

causing the pressure of the plate 200 of the guiding or straightening device 190 to be varied.

There is a tendency of the article being acted upon to move with the brush as the liquid substance is being applied thereto, and in order to avoid this I pivot a series of lever-arms 220, as at 221, to the side of the channel or guide 181, each in position to extend over one of the caps 20. The top of this channel or guide 181 is cut away, as at 222, adjacent to each of these lever-arms, to allow a presser-roller 223, carried by the latter, to bear upon the top side of the belt 75 and press the same and the belt 70, with the article between them, (and being acted upon by the brush,) upon the roller 71^a or 71^b beneath it. These presser-rollers 223 are each caused to bear with variable tension by means of an expansible helical spring 224, bearing between the end of lever 220 and a nut 225, screwed upon the upper end of a rod 226, pivotally connected, as at 227, to the side of channel or guide 181, the nut 225 being retained against accidental displacement by a jam-nut 228.

I have discovered that some articles, such as papers with surfaces of different degrees of finish or glossiness, require a greater or less action of the brushes, and in order to effect this without changing the speed of the conveyers I provide for the adjustment of the speed of the fountain-fed brushes, and to this end I construct the pulleys 135 and 130 as stepped pulleys, the pulley 135 having steps of decreasing diameter from the side of the machine outwardly, while the pulley 130 has steps of increasing diameter from the side of the machine outwardly.

A shaft 250 is mounted in the boss 55 and bearings 56, and a pair of pulleys 251 252 and a sprocket-wheel 253 are rigidly secured thereon. A belt 254 connects the pulley 251 to the pulley *v* upon the shaft *t* of the fountain-roll, and a belt 255 connects the pulley 252 to the pulley *k* upon the brush-shaft, while the sprocket-wheel 253 is driven by chains 147.

Power is transmitted from driving-shaft 126 to the drum by a train of gears 300, 301, 302, 303, 304, and 305, from the drum 72 to the shaft 83^c by gears 306 and 307, and from shaft 83 to the shaft 831 by gears 308 and 309.

In Figs. 5, 6, and 10 the machine is illustrated in the act of operating upon a sheet of note-paper Z, such paper being shown in dotted lines in Fig. 6 and in cross-section in Figs. 5 and 10.

The operation of my machine is as follows: The parts of the machine are first adjusted to suit the width of the sheet, as follows: The pulleys 82 82^a 85 85^a 85^b 85^c 85^d 85^e 86 86^a and the rollers 82^b 82^c, and the fountain-fed brushes are adjusted laterally in respect to the center or main supporting-belt 70. The

pulleys 82 and 82^a are first adjusted to accommodate the width of the sheet and are preferably positioned to have the side edges of the latter overlap them slightly. The table-gage *d* is then adjusted into alinement with a point slightly outside of the off edge of pulley 82. The screws *e* are then loosened, and the gages 10 are then adjusted laterally, according to the width of border required, and the straightening-gages 190 are adjusted to accommodate the width of the sheet. If it is found that the sheets are of such a width that the portions between the supporting-rollers sag down, I move the grooved rollers 174^c and 174^d to positions in line with such sagging portions and shift the cords from the groove in which they lie when not required to positions to support the said sagging portions. The brushes are then adjusted laterally to positions to act upon the gages 10 and the portions of the sheets carried by the auxiliary belts (which act as traveling tables) and projecting over gages 10 and then vertically to bear with sufficient tension upon the gages 10 to snap therefrom smartly down upon the sheet in close proximity to the said gages. The fountains are then filled and the flow therefrom adjusted and such fountains themselves adjusted into proper relation to the brushes, and finally the speed of the brushes and fountains is adjusted according to the surface of the paper. The machine is then ready to be started. Upon the clutch being thrown in the machine is started; but as the brush-carriers are raised to support the brushes out of bearing relation with the carrying-belts or traveling tables it will be necessary to lower them before they will apply the bordering substance. This I do after sufficient sheets of paper have been taken in by the conveyers to extend slightly beyond such brushes in order to prevent the carrying-belts being smeared. The bordered sheets of paper are conveyed from the brushes past the fans, which dry them, to the receptacle. The traveling auxiliary belts 80 and 81 prevent soiling of the under sides of the sheets.

In order to border the ends of sheets, they must be run through the machine a second time, and if they are of oblong form the pulleys 82^a, 85^a, 86^a, 85^c, and 85^e, the rollers 82^b, and the grooved rollers 174^a are adjusted laterally, as required, and the "straightening" and "border - defining" gages, the fountains, and brushes on the side corresponding to the last-mentioned pulleys and rollers are adjusted accordingly, the other gages, pulleys, and rollers remaining the same.

What I claim is as follows:

1. In a machine for applying a liquid substance to portions of a surface, the combination with means for applying the substance

to a defined portion of the surface of an article, of means for varying such portion.

2. In a machine for edging or bordering letter-paper and envelopes for the production of mourning stationery the combination with a traveling support for sheets of paper or envelopes arranged in line with their edges abutting to have a bordering liquid substance applied thereto, of a rotary brush arranged with its axis parallel to the line of travel of the support, means for rotating such brush, and means for feeding a liquid substance to such brush, and means for causing the said brush to act upon the border only of the said paper or envelopes, for the purpose set forth.

3. In a machine for edging or bordering letter-paper and envelopes for the production of mourning stationery the combination with a support for sheets of paper or envelopes arranged in line with their edges abutting to have a liquid substance applied thereto, of a rotary cylindrical brush, means for rotating such brush, means for feeding a liquid substance to such brush, means for adjusting such brush toward and from the support, and means for causing the said brush to act upon the border only of the said paper or envelopes, for the purpose set forth.

4. In a machine for edging or bordering letter-paper and envelopes for the production of mourning stationery, the combination with a horizontal support for sheets of paper or envelopes arranged in line with their edges abutting to have a liquid substance applied thereto, of a rotary bristle-brush above and in vertical line with the support, means for rotating such brush, means for feeding a liquid substance to such brush, means for vertically and horizontally adjusting such brush relatively to the support, and means for causing the said brush to act upon a defined portion only of the said paper or envelop for the purpose set forth.

5. In a machine for edging or bordering letter-paper and envelopes for the production of mourning stationery the combination with a traveling support for sheets of paper or envelopes arranged in line with their edges abutting to have a bordering liquid substance applied thereto, of a rotary brush above and in vertical line with the support and arranged with its axis parallel to the line of travel of the support, means for rotating such brush, means for feeding a liquid substance to such brush, means for vertically adjusting such brush relatively to the support, and means for causing the said brush to act upon the border only of the said paper or envelopes, for the purpose set forth.

6. The combination with an endless table for supporting an article to have a liquid substance applied thereto, means for retaining the article upon such table and means for causing such table to travel, of a rotary

brush above and in vertical line with the support and arranged with its axis parallel to the line of travel of the table, means for rotating such brush, means for feeding a liquid substance to such brush, and, means for adjusting such brush relatively to the table, for the purpose set forth.

7. The combination with an endless table for supporting an article to have a liquid substance applied thereto, means for retaining the articles upon such table and means for causing such table to travel, of a rotary brush above and in vertical line with the support, means for rotating such brush, means for feeding a liquid substance to such brush, and means for vertically and horizontally adjusting such brush relatively to the table, for the purpose set forth.

8. The combination with a support for an article to have a liquid substance applied to a portion of the surface of one side thereof, of a rotary brush, means for rotating the brush, means for feeding a liquid substance to such brush, and a device beneath the brush for defining the portion of the surface acted upon by the brush, for the purpose set forth.

9. The combination with a support for an article to have a liquid substance applied thereto, of a rotary brush, means for rotating such brush, means for feeding a liquid substance to such brush, a device for defining the area acted upon by the brush and means for adjusting the device for the purpose of varying such area, and means for adjusting such brush relatively to the support; for the purpose set forth.

10. The combination with an endless table for supporting an article to have a liquid substance applied thereto, means for retaining the article upon such table and means for causing such table to travel, of a movable brush, means for imparting movement to the brush, means for feeding a liquid substance to said brush, and means for positioning the article relatively to the brush, for the purpose set forth.

11. The combination with an endless table for supporting an article to have a liquid substance applied thereto, means for retaining the article upon such table and means for causing such table to travel, of a rotary brush, means for rotating such brush, means for feeding a liquid substance to such brush, and means for positioning the article relatively to the brush, for the purpose set forth.

12. The combination with an endless table for supporting an article to have a liquid substance applied thereto, means for retaining the article upon such table and means for causing such table to travel, of a rotary brush, means for rotating such brush, means for feeding a liquid substance to such brush, means for positioning the article relatively to the brush, and a device for defining the area

acted upon by the brush, for the purpose set forth.

13. The combination with an endless table for supporting an article to have a liquid substance applied thereto, means for retaining the article upon such table and means for causing such table to travel, of a rotary brush, means for rotating such brush, means for feeding a liquid substance to such brush, a device for defining the area acted upon by the brush, and means for vertically and horizontally adjusting such brush relatively to the table, for the purpose set forth.

14. The combination with the frame of a machine and a traveling support thereon for an article to have a liquid substance applied thereto, of a carrier mounted upon the frame above the traveling support, means for horizontally adjusting the carrier upon the frame, a brush for applying a liquid substance to the article such brush being arranged with its axis parallel to the line of travel of the support, and means securing such brush upon the carrier in position to act upon an article upon the support.

15. The combination with the frame of a machine and a traveling support thereon for an article to have a liquid substance applied thereto, of a carrier mounted upon the frame above the traveling support, a rotary brush for applying a liquid substance to the article, such brush being arranged with its axis parallel to the line of travel of the support, and means for feeding a liquid substance to the brush, means securing such brush upon the carrier in position to act upon an article upon the support.

16. The combination with the frame of a machine and a horizontal traveling support thereon for an article to have a liquid substance applied thereto, of a carrier mounted upon the frame, means for horizontally adjusting the carrier upon the frame, a rotary brush for applying a liquid substance to the article, means for feeding a liquid substance to the brush, means securing such brush upon the carrier in position to act upon an article upon the support, and means for vertically adjusting the brush upon the carrier and relatively to the support.

17. In a machine for applying a liquid substance to an article, a rotary brush, means for rotating such brush, and a fountain for feeding a liquid substance to the brush, such fountain consisting of a dish adjustably mounted adjacent to the brush and having a shaft rotatably mounted therein, a fountain-roller mounted upon the shaft, a scraper and adjustable means for retaining such scraper in variable adjacency to the face of the roller for the purpose of regulating the quantity of liquid substance carried thereby.

18. In a machine for applying a liquid sub-

stance to an article, a rotary brush, means for rotating such brush, and a fountain for feeding a liquid substance to the brush, such fountain consisting of a dish mounted adjacent to the brush and having a shaft rotatably mounted therein, a fountain-roller mounted upon the shaft, a scraper constructed to straddle the roller, and means for retaining such scraper adjacent to the face of the roller for the purpose of regulating the quantity of liquid substance carried thereby.

19. In a machine for applying a liquid substance to an article, a rotary brush, means for rotating such brush, and a fountain for feeding a liquid substance to the brush, such fountain consisting of a dish adjustably mounted adjacent to the brush and having a shaft rotatably mounted therein, a fountain-roller mounted upon the shaft, a scraper constructed to straddle the roller, and adjustable means for retaining such scraper in variable adjacency to the face of the roller for the purpose of regulating the quantity of liquid substance carried thereby.

20. In a machine for applying a liquid substance to an article, the combination with a support for the article, a fountain-fed brush by which the liquid substance is applied to the article, and means for rotating the brush, of a gage for defining the portion of the article acted upon and consisting of a strip resting upon the article beneath the brush and extending parallel to the axis of the latter, and means for securing such strip in place.

21. In a machine for applying a liquid substance to an article, the combination with a support for the article, a fountain-fed brush by which the liquid substance is applied to the article, and means for rotating the brush, of a gage for defining the portion of the article acted upon and consisting of a strip resting upon the article beneath the brush and extending parallel to the axis of the latter, and adjustable means for securing such strip in place and adjusting the same relatively to the brush.

22. In a machine for applying a liquid substance to an article, the combination with a support for the article, a fountain-fed brush by which the liquid substance is applied to the article, and means for rotating the brush, of a gage for defining the portion of the article acted upon and consisting of a strip resting upon the article beneath the brush and extending parallel to the axis of the latter, means for causing such strip to bear with varying degrees of tension upon the article, and means for securing such strip in place.

23. In a machine for applying a liquid substance to an article, the combination with a support for the article, a fountain-fed brush by which the liquid substance is applied to the article, and means for rotating the brush, of a gage for defining the portion of the arti-

cle acted upon and consisting of a strip resting upon the article beneath the brush and extending parallel to the axis of the latter, means for causing such strip to bear with varying degrees of tension upon the article, and adjustable means for securing such strip in place, and adjusting the same relatively to the brush.

24. In a machine for applying a liquid substance to an article, the combination with a support for the article, a fountain-fed brush by which the liquid substance is applied to the article, means for rotating the brush, and means for moving the support beneath the brush and parallel to the axis of the latter, of a gage for defining the portion of the article acted upon and consisting of a strip resting upon the article beneath the brush and extending parallel to the axis of the latter, such strip having the end thereof beneath which the article first enters, upwardly flared, and the portion adjacent to the opposite side of the brush upset, and means for securing such strip in place.

25. In a machine for applying a liquid substance to an article, the combination with a support for the article, a fountain-fed brush by which the liquid substance is applied to the article, means for rotating the brush, and means for moving the support beneath the brush and parallel to the axis of the latter, of a gage for defining the portion of the article acted upon and consisting of a strip resting upon the article beneath the brush and extending parallel to the axis of the latter, such strip having the end thereof beneath which the article first enters, upwardly flared, and the portion adjacent to the opposite side of the brush upset, means for causing such strip to bear with varying degrees of tension upon the article, and adjustable means for securing such strip in place.

26. In a machine for edging or bordering letter-paper and envelopes for the production of mourning stationery, the combination with a support for sheets of paper or envelopes arranged in line with their edges abutting, a fountain-fed brush by which the liquid substance is applied to the article, means for operating the brush, and means for moving the support beneath the brush, of means independent of the support for positioning the article upon the said support and relatively to the brush while it is traveling to the brush, and means for causing the said brush to act upon the border only of the said paper or envelopes, for the purpose set forth.

27. In a machine for applying a liquid substance to an article, the combination with a support for the article, a fountain-fed brush by which the liquid substance is applied to the article, means for rotating the brush, and means for moving the support beneath the brush and parallel to the axis of the latter, of

means for positioning the article upon the support and relatively to the brush while it is traveling to the brush.

28. In a machine for applying a liquid substance to an article, the combination with a support for the article, a fountain-fed brush by which the liquid substance is applied to the article, means for rotating the brush, and means for moving the support beneath the brush and parallel to the axis of the latter, of means for positioning the article upon the support and relatively to the brush while it is traveling to the brush, a gage for defining the portion of the article acted upon and consisting of a strip resting upon the article beneath the brush and extending parallel to the axis of the latter, and means for securing such strip in place.

29. In a machine for applying a liquid substance to an article, the combination with a support for the article, a fountain-fed brush by which the liquid substance is applied to the article, means for rotating the brush, and means for moving the support beneath the brush and parallel to the axis of the latter, means for positioning the article relatively to the brush, such last-mentioned means consisting of a pair of angular guiding members constructed and arranged to have the article pass therebetween and ride over a portion thereof, and presser means adapted to retain the article against vertical displacement as it passes through such positioning means.

30. In a machine for applying a liquid substance to an article, the combination with a support for the article, a fountain-fed brush by which the liquid substance is applied to the article, means for rotating the brush, and means for moving the support beneath the brush and parallel to the axis of the latter, means for positioning the article relatively to the brush, such means consisting of a pair of angular guiding members constructed and arranged to have the article pass therebetween and ride over a portion thereof, and adjustable presser means adapted to retain the article against vertical displacement as it passes through such positioning means.

31. In a machine for applying a liquid substance to an article, the combination with a support for the article, a fountain-fed brush by which the liquid substance is applied to the article, means for rotating the brush, and means for moving the support beneath the brush and parallel to the axis of the latter, means for positioning the article relatively to the brush, such means consisting of a pair of angular guiding members constructed and arranged to have the article pass therebetween and ride over a portion thereof, and a pair of presser-plates adapted to retain the article against vertical displacement as it passes through such positioning means.

32. In a machine for applying a liquid substance to an article, the combination with the

frame of the machine, and a pair of parallel traveling tables for supporting the articles to be acted upon, of a member extending transversely of the machine, a pair of members mounted upon the transverse member one over each traveling table, a device for applying a liquid substance mounted upon each member of the pair, means for moving the transverse member toward and from the tables, means for horizontally adjusting the pair of members transversely to the tables.

33. In a machine for applying a liquid substance to an article, the combination with the frame of the machine, and a pair of parallel traveling tables for supporting the article to be acted upon, of a member extending transversely of the machine a pair of members mounted upon the transverse member one over each traveling table, a device for applying a liquid substance mounted upon each member of the pair, means for moving the transverse member toward and from the tables, means for horizontally adjusting the pair of members transversely to the tables, and means for vertically adjusting the liquid substance supplying devices.

34. In a machine for applying a liquid substance to an article, the combination with the frame of the machine, and a pair of parallel traveling tables for supporting the articles to be acted upon, of a member extending transversely of the machine, a pair of members mounted upon the transverse member one over each traveling table, a fountain-fed brush for applying a liquid substance mounted upon each member of the pair, means for moving the transverse member toward and from the tables, and means for horizontally adjusting the pair of members transversely to the tables.

35. In a machine for applying a liquid substance to an article, the combination with the frame of the machine, and a pair of parallel traveling tables for supporting the articles to be acted upon, of a member extending transversely of the machine, a pair of members mounted upon the transverse member one over each traveling table, a fountain-fed brush for applying a liquid substance mounted upon each member of the pair, means for moving the transverse member toward and from the tables, means for horizontally adjusting the pair of members transversely to the tables, and means for vertically adjusting the fountain-fed brush.

36. In a machine for applying a liquid substance to an article, the combination with the frame of the machine having a pair of vertical dovetail guideways formed in portions thereof above the main frame and facing toward one another and a pair of parallel traveling tables for supporting the articles to be acted upon, of a web having a pair of dovetail projections on opposite sides of the opposite ends thereof and slidably located in

the vertical dovetail guideways; means whereby such web is raised and lowered; a pair of members each having a dovetail projection, such dovetail projections being adapted to be slidably located in horizontal dovetail guideways in opposite sides of the web; means for adjusting the members toward and from one another; a pair of fountain-fed brushes mounted one upon each member; and means for vertically adjusting such brushes.

37. In a machine for applying a liquid substance to an article, the combination with a device whereby the liquid substance is applied, of means for conveying the articles to the applying device consisting of an endless belt extending beneath the applying device, means for causing such belt to travel, a retaining-belt bearing upon the first-mentioned belt, means for causing the retaining-belt to travel with the first-mentioned belt, such belts being adapted to carry the article between them, and means for supporting the lower belt while the article is having the liquid substance applied thereto.

38. In a machine for applying a liquid substance to an article, the combination with a device whereby the liquid substance is applied, of means for conveying the article to the applying device consisting of a main endless conveying and supporting belt, auxiliary supporting-belts located on each side of the main belt, a main endless retaining-belt bearing upon the main conveying and supporting belt, a series of retaining-loops, such supporting-belts and retaining belts and loops being adapted to retain the article between them, means for causing the said belts and loops to travel in unison, and means for supporting the article when the liquid substance is being applied thereto.

39. In a machine for applying a liquid substance to an article, the combination with a device whereby the liquid substance is applied, such device being located between the ends of the machine, of a drum located near one end of the machine, a series of coaxially-

arranged pulleys located near the opposite end of the machine, a series of pulleys located beneath the drum, a series of rollers intervening the first-mentioned series of pulleys and the drum, a series of supporting-belts looped around the first-mentioned series of pulleys and the drum, a series of pulleys distributed one above and in close proximity to the first-mentioned series of pulleys, another above that last-mentioned, another beyond and above the drum, and one below the drum, a retaining-belt coinciding with the main supporting-belt looped over the last-mentioned series of pulleys over the first-mentioned pulley below the drum and over the drum, and means for rotating such drum.

40. The combination with an endless table for supporting an article to have a liquid substance applied thereto, means for retaining the article upon such table and means for causing such table to travel, of a rotary brush located adjacent to the center of the machine, a second rotary brush located adjacent to the center of the machine, a chain-driving gear located at each side of the machine and a pair of chains one driven by the gear at one side of the machine and operatively connected to the first-mentioned brush, and the other driven by the gear at the opposite side of the machine and operatively connected to the other brush for the purpose of causing the brushes to rotate in opposite directions, means for rotating such brush, means for operating the chain-driving mechanism, means for feeding a liquid substance to the brushes, means for positioning the article relatively to the brushes, and a device for defining the area acted upon by the brushes, for the purpose set forth.

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

WILLIAM RICHARD PHILLIPS.

Witnesses:

FRED J. SEARS,
ALEX. CURRIE.