No. 671,790.

Patented Apr. 9, 1901.

D. L. CHANDLER.

PLAITING MACHINE.

(Application filed July 11, 1900.)

(No Model.)

6 Sheets—Sheet 1.

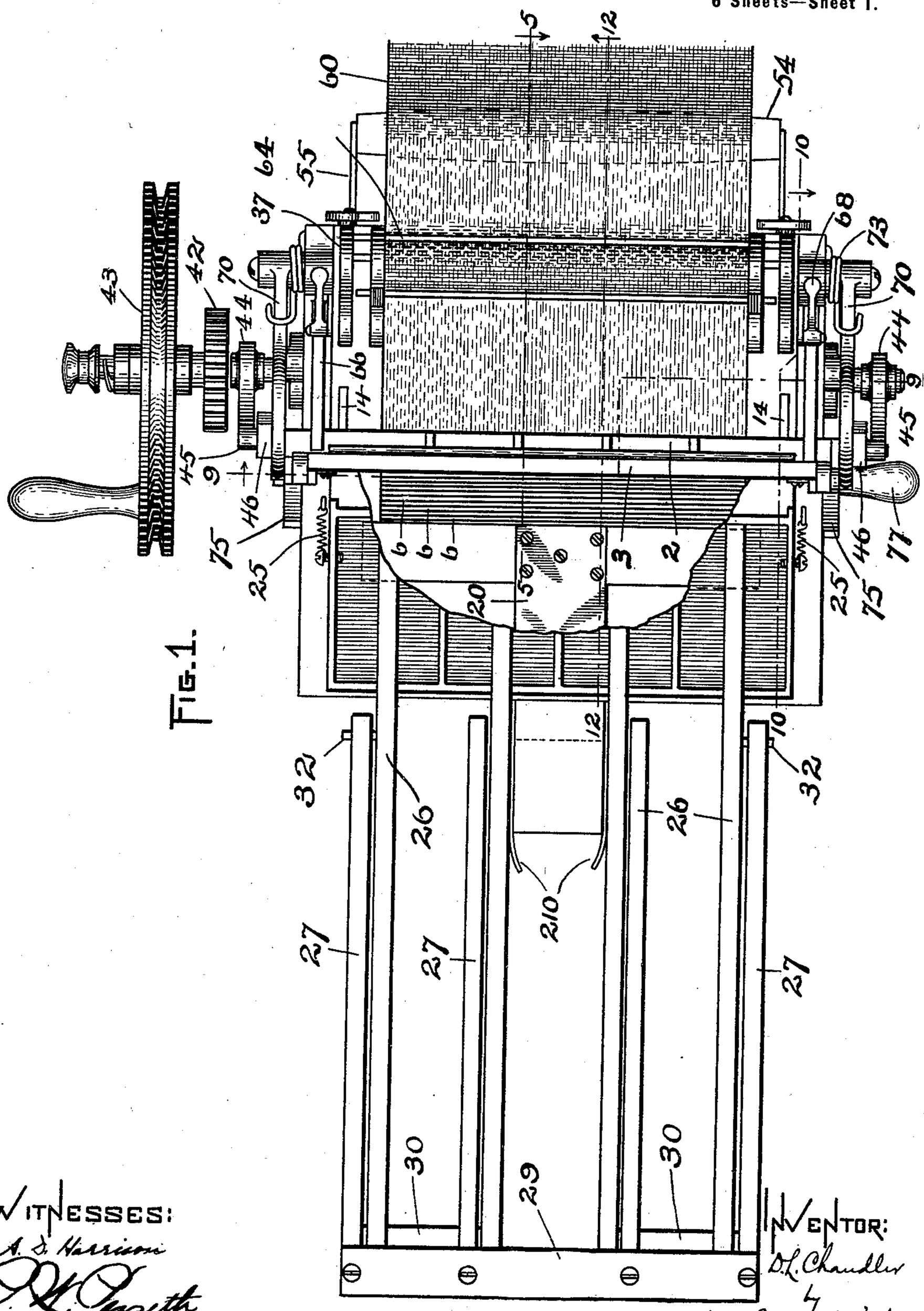


FIG. 1.

WITNESSES:

A. D. Harrison

D. L. Pezzeth.

INVENTOR:

D. L. Chandler

by Wright Brown & Quinby

Attys.

No. 671,790.

Patented Apr. 9, 1901.

D. L. CHANDLER.

PLAITING MACHINE.

(Application filed July 11, 1900.)

(No Model.)

6 Sheets—Sheet 2.

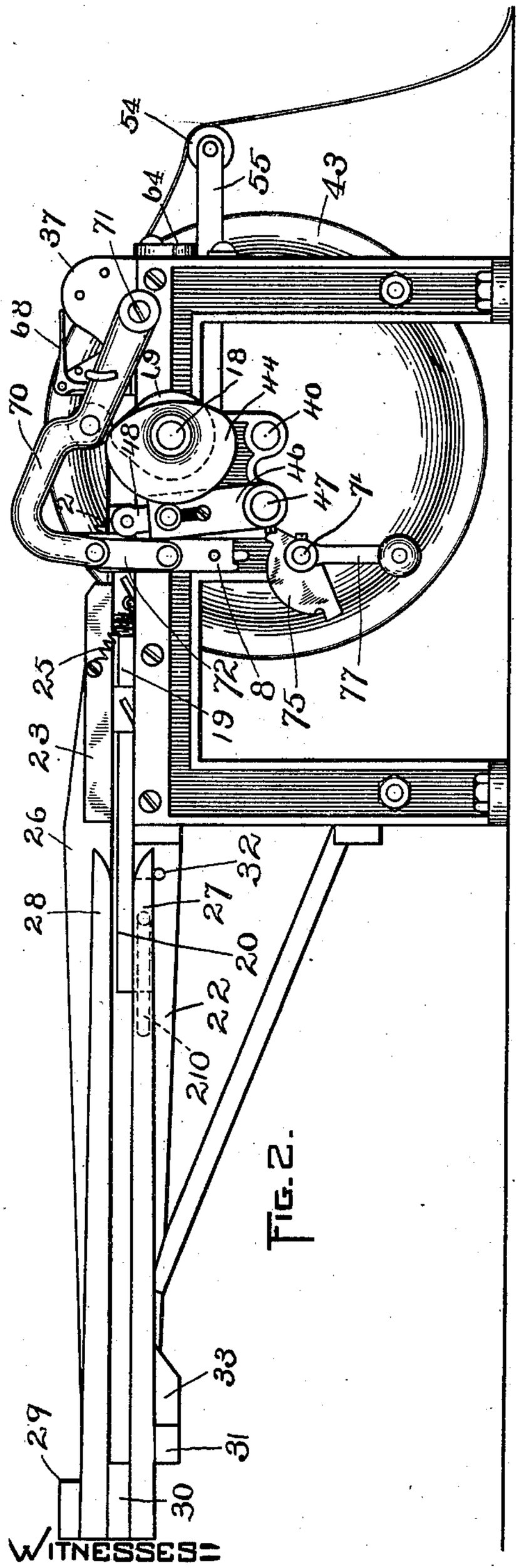


FIG. 2.

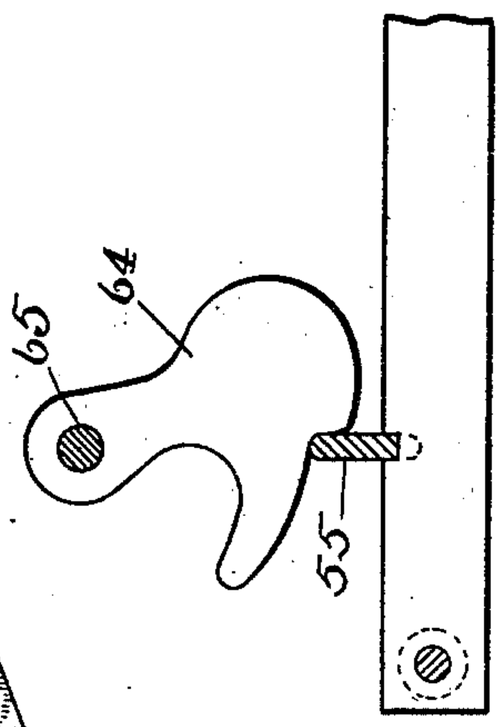


FIG. 4.

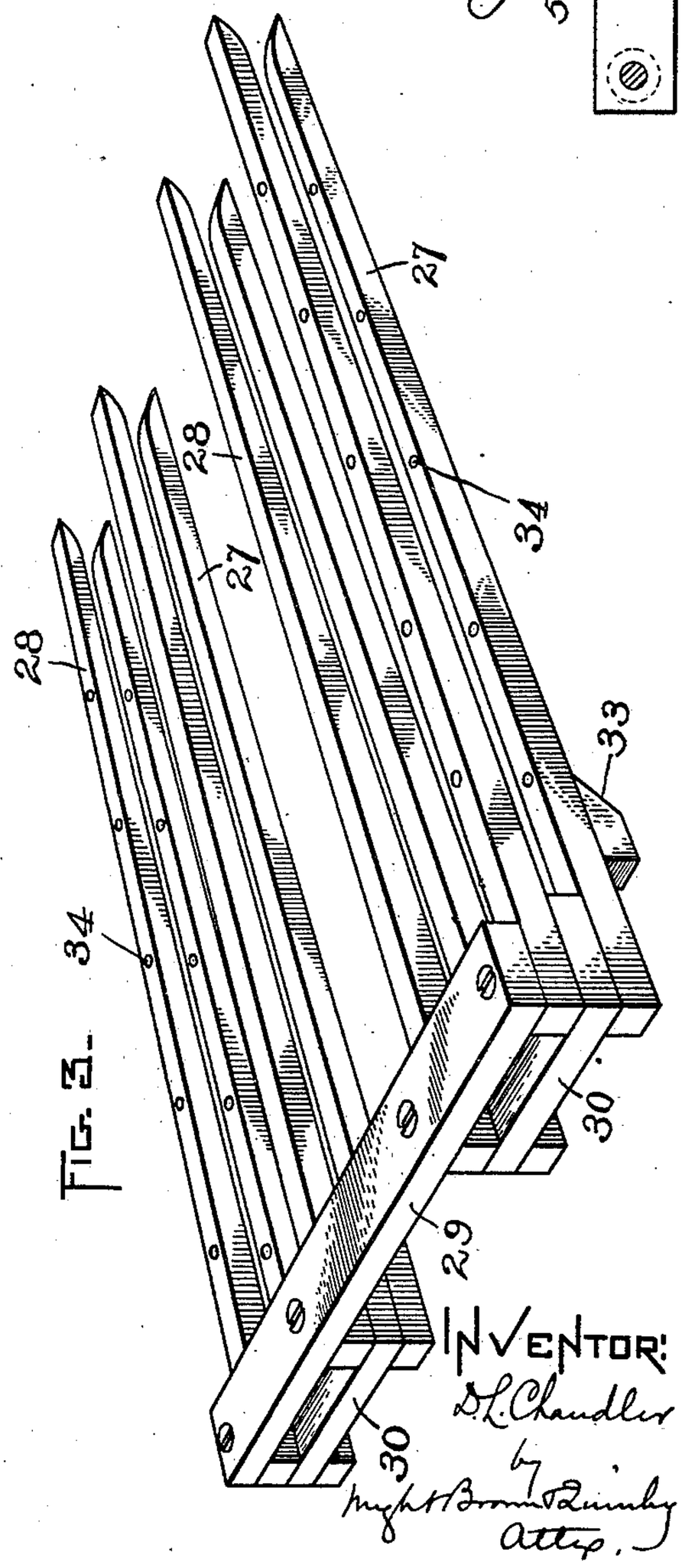


FIG. 3.

WITNESSES:
A. D. Harrison
D. H. Liggett

INVENTOR:
D. L. Chandler
by
Wright Brown & Quinby
Attys.

No. 671,790. Patented Apr. 9, 1901.

D. L. CHANDLER.

PLAITING MACHINE.

(Application filed July 11, 1900.)

(No Model.) 6 Sheets—Sheet 3.

FIG. 5.

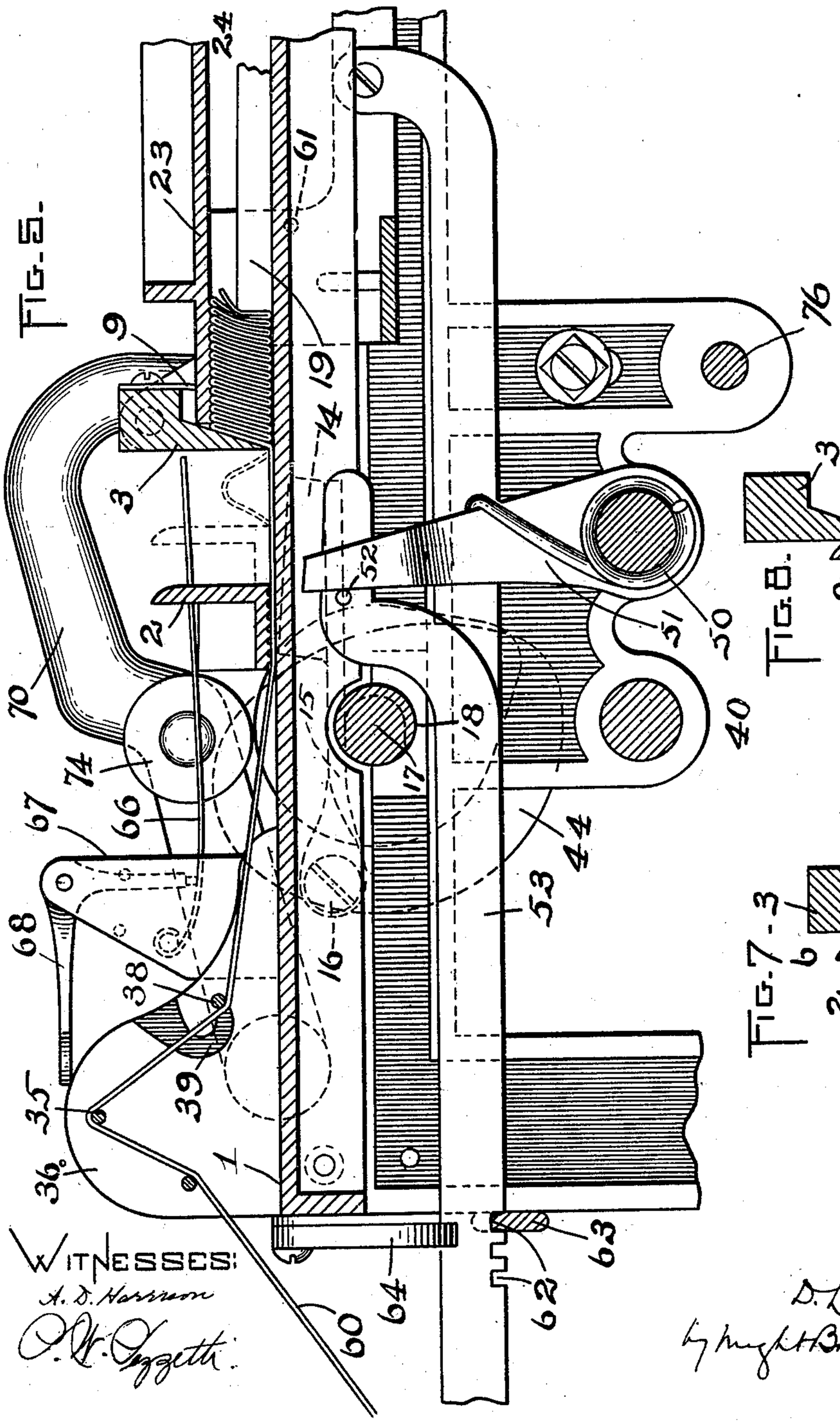


FIG. 8.

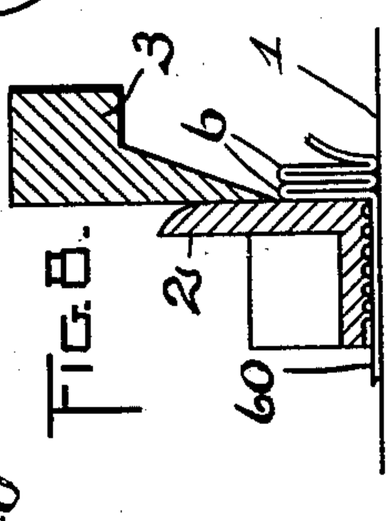
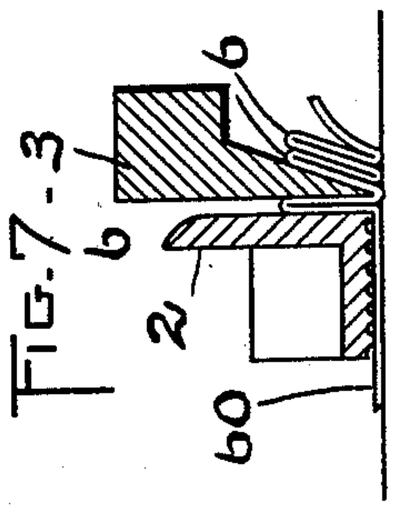


FIG. 7-3



WITNESSES:
A. D. Harrison
O. W. Legget.

INVENTOR:
D. L. Chandler
by Wright Brown & Quinby
Attys.

No. 671,790. Patented Apr. 9, 1901.

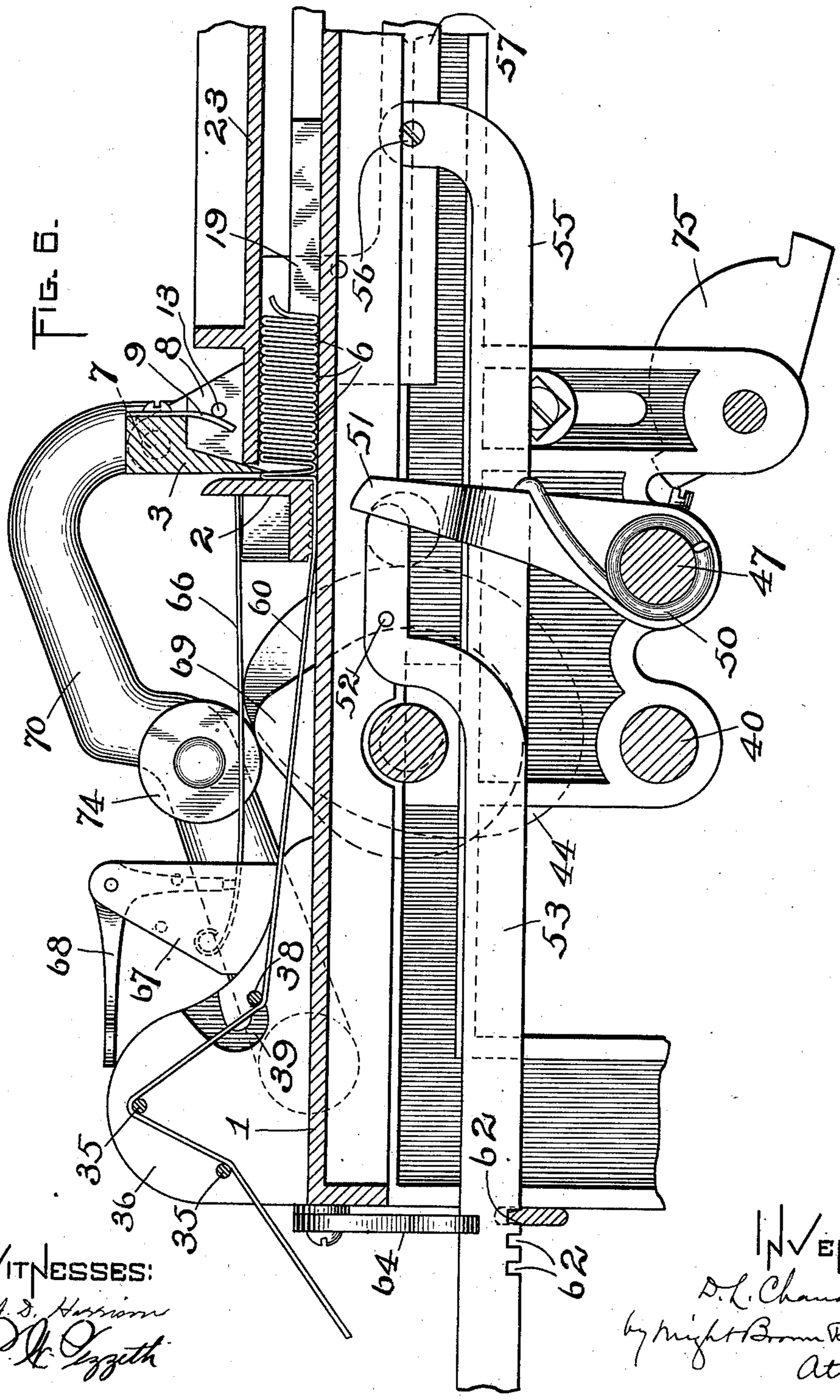
D. L. CHANDLER.

PLAITING MACHINE.

(Application filed July 11, 1900.)

(No Model.) 6 Sheets—Sheet 4.

FIG. 6.



WITNESSES:

A. D. Harrison

D. L. Tuttle

INVENTOR:

D. L. Chandler

by Wright Brown Quinby & Atty's.

No. 671,790. Patented Apr. 9, 1901.

D. L. CHANDLER.

PLAITING MACHINE.

(Application filed July 11, 1900.)

(No Model.) 6 Sheets—Sheet 5.

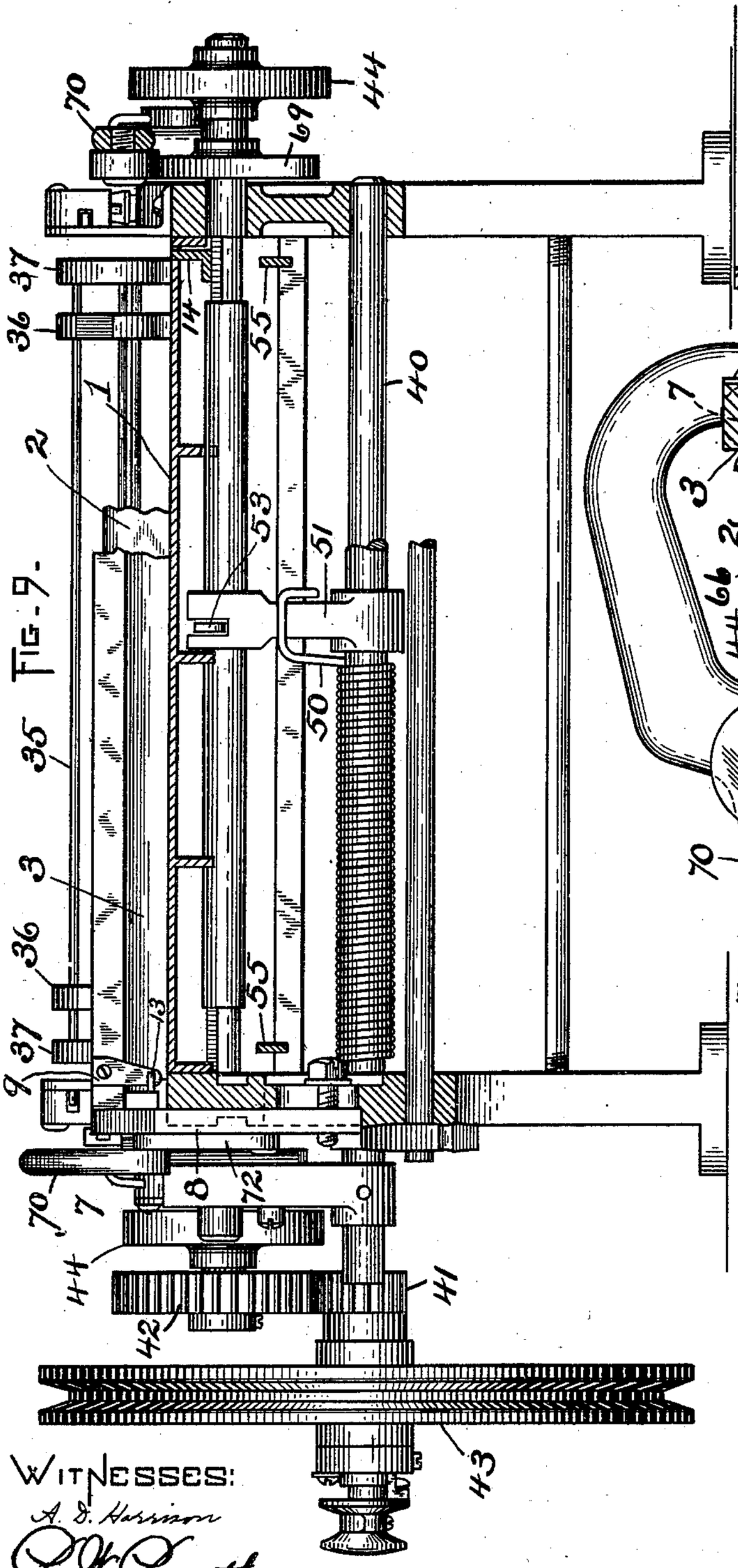


FIG. 9.

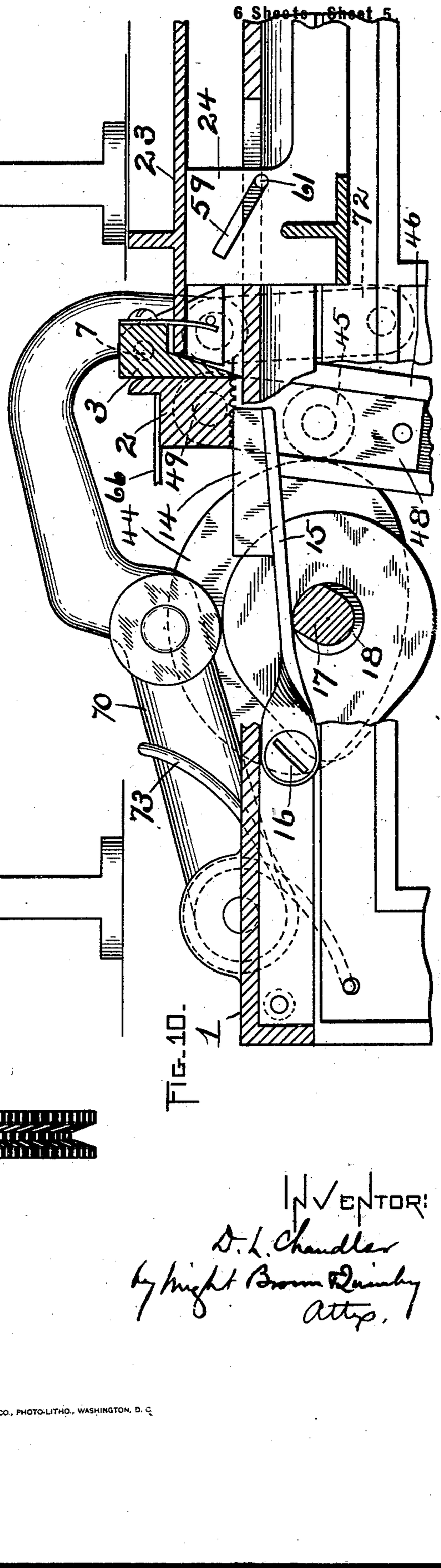


FIG. 10.

WITNESSES:
A. D. Harrison
P. H. Leggett

INVENTOR:
D. L. Chandler
by Wright Brown Quinby
Attys.

No. 671,790. Patented Apr. 9, 1901.

D. L. CHANDLER.

PLAITING MACHINE.

(Application filed July 11, 1900.)

(No Model.) 6 Sheets—Sheet 6.

FIG. 11.

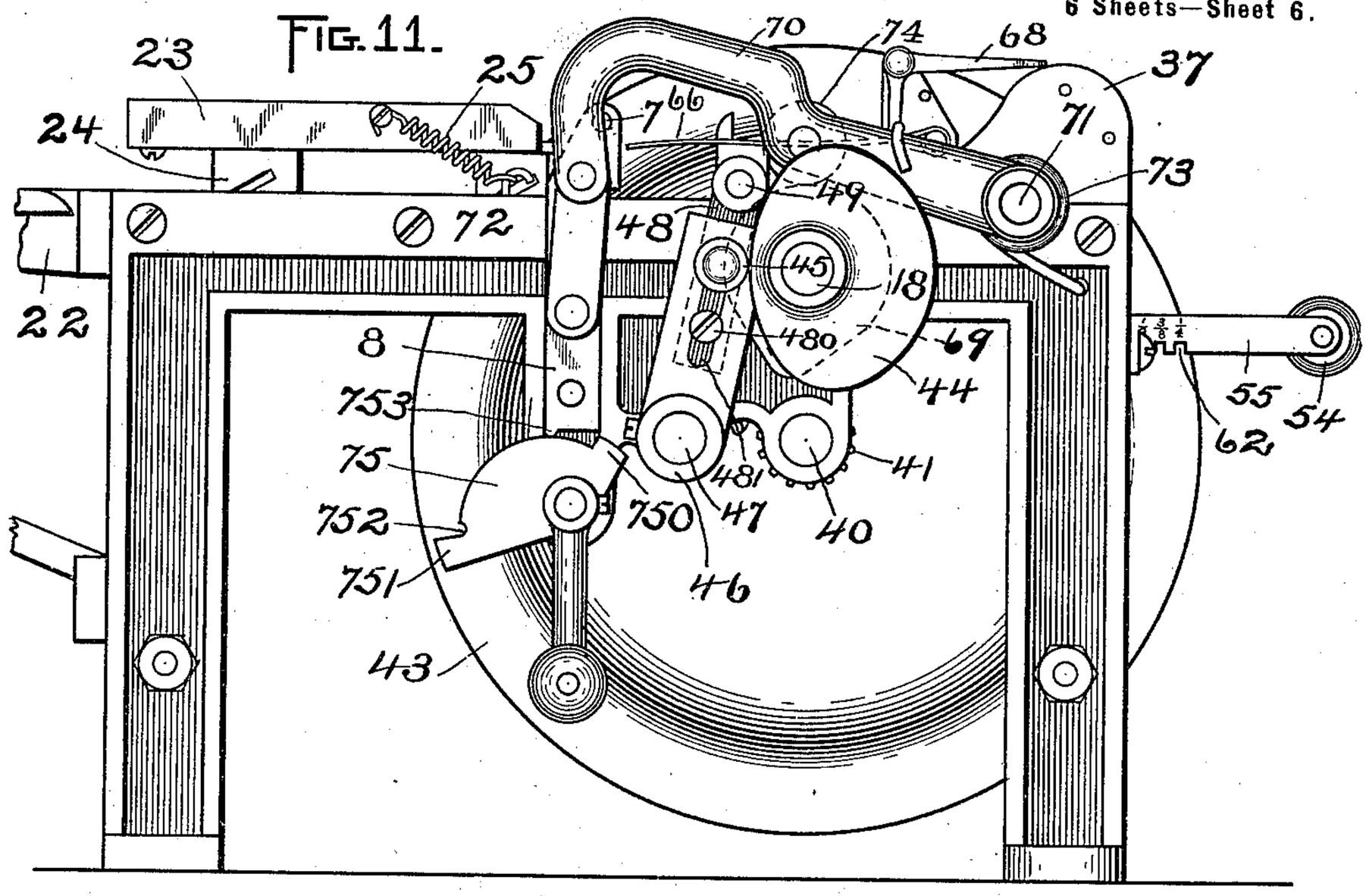
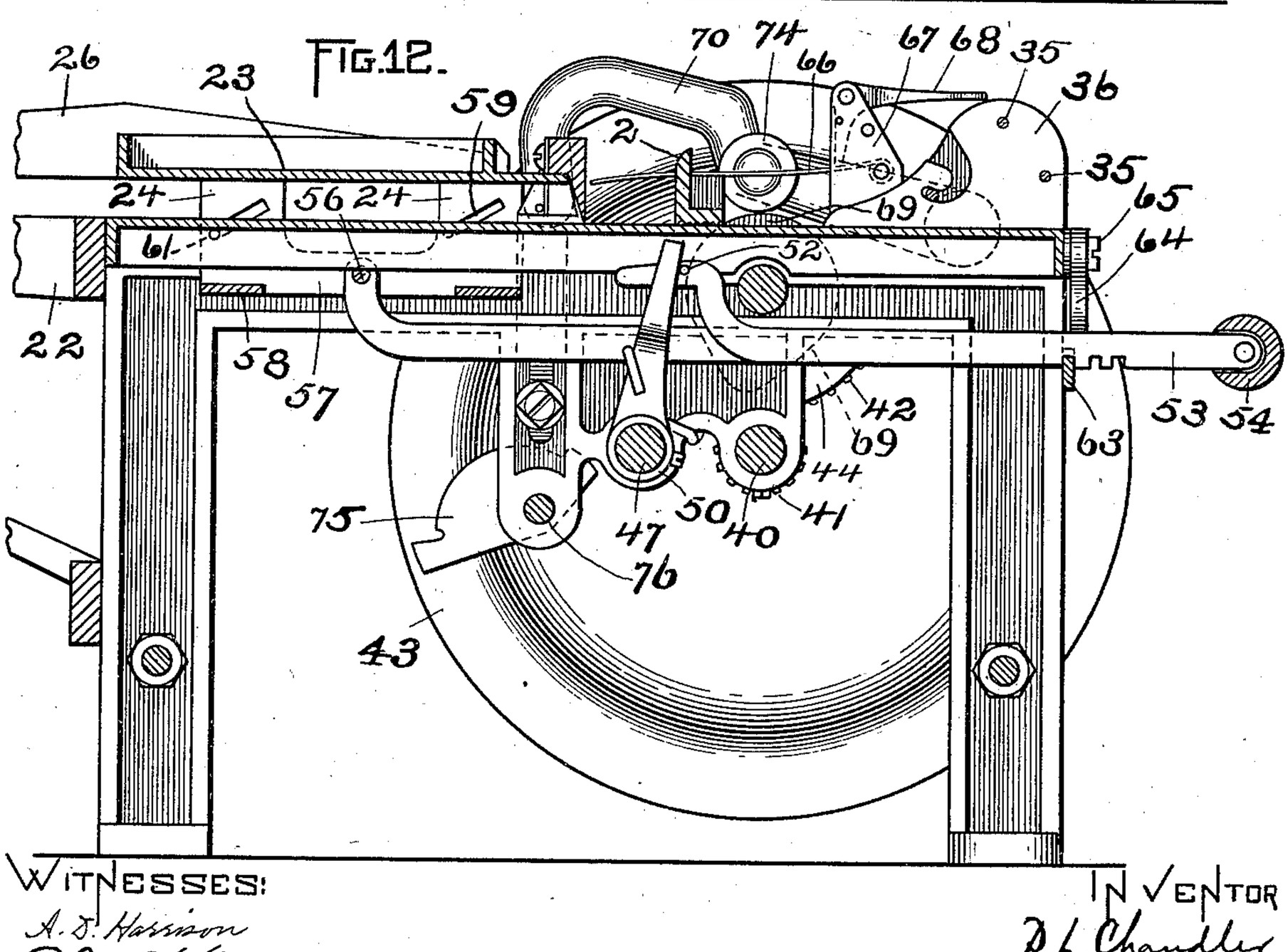


FIG. 12.



WITNESSES:
A. D. Harrison
D. H. Pezzetti

INVENTOR
D. L. Chandler
by Wright Brown & Quinby
Attys

UNITED STATES PATENT OFFICE.

DANIEL L. CHANDLER, OF AYER, MASSACHUSETTS, ASSIGNOR TO GEORGE J. BURNS, OF SAME PLACE.

PLAITING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 671,790, dated April 9, 1901.

Application filed July 11, 1900. Serial No. 23,196. (No model.)

To all whom it may concern:

Be it known that I, DANIEL L. CHANDLER, of Ayer, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Plaiting-Machines, of which the following is a specification.

This invention has for its object to provide a machine for making so-called "accordion plaiting," or, in other words, forming a series of folds in a strip of fabric, the said folds lying side by side, as hereinafter set forth.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a top plan view of a plaiting-machine embodying my invention. Fig. 2 represents a side elevation of the same. Fig. 3 represents perspective view of the detachable receiver for the plaited strip. Fig. 4 represents a view of one of the locking-cams hereinafter referred to. Fig. 5 represents a section on line 5 5 of Fig. 1. Fig. 6 represents a view similar to Fig. 5, showing a different stage of the operation. Figs. 7 and 8 represent views similar to portions of Figs. 5 and 6, showing other stages of the operation. Fig. 9 represents a section on line 9 9 of Fig. 1. Fig. 10 represents a section on line 10 10, Fig. 1. Fig. 11 represents a side elevation taken from the side opposite that shown in Fig. 2. Fig. 12 represents a section on line 12 12, Fig. 1.

The same reference characters indicate the same parts in all the figures.

In the drawings, 1 represents a flat horizontal table mounted on a suitable supporting-frame, the upper surface of the table being preferably polished, so that a piece of fabric can be moved upon it, as hereinafter described, with the minimum frictional resistance. The table may be a metal plate with its upper surface nickel-plated.

2 and 3 represent plaiting or folding jaws, which coöperate in forming a series of plaits or folds 6 on a strip 60 of fabric resting on the table. The jaw 2 is movable horizontally over the table toward and from the jaw 3 and has a roughened or corrugated horizontal feeding-face parallel with the table and bearing on the strip 60 and a fold-pressing face standing at an angle with the table. The jaw 3 has a vertical movement, caused by the mechanism hereinafter described, toward and from the table and has a fold-pressing face, which acts in opposition to the fold-pressing face of the jaw 2, and an inclined rear face, which presses along or feeds the folds when the jaw 3 is descending.

The jaws 2 and 3 are moved by the mechanism hereinafter described, their movements being timed as follows: The jaw 3 being depressed and its lower edge bearing on the strip 60 and holding the latter against the table, as shown in Fig. 5, and the jaw 2 being separated from the jaw 3, as shown in full lines in said figure, the jaw 2 is first moved forward, the jaw 3 remaining stationary. The roughened strip-feeding face of the jaw 2 engages and moves the portion of the strip 60 on which it bears and causes the portion of the strip between the two jaws to rise in the form of a loop or bend, as indicated by dotted lines in Fig. 5. The forward movement of the jaw 2 continues until the sides of the loop are pressed together between the jaws, thus forming a plait or fold 6, as shown in Fig. 7. The jaw 3 is at this time supported against the pressure exerted by the jaw 2, so that the interposed fold is closely and effectively pressed, the jaw 3 constituting a practically rigid abutment. The jaw 2 then stops and remains at rest, while the jaw 3 rises until its lower edge is above the fold last formed. The jaw 3 has trunnions 7 at its ends, fitted to turn in sockets in the carrying-slides 8, hereinafter described, and its lower edge is normally pressed toward the jaw 2 by springs 9, Figs. 5 and 6, affixed to the jaw 3 and bearing against studs 13 on the said slides. When, therefore, the lower edge of the jaw 3 clears the fold last formed, it swings over the said fold against the jaw 2, as shown in Fig. 8. The jaw 3 then descends while in contact with the jaw 2, forcing the fold last formed against the next fold and holding the strip at the base of the last fold against the table, so that the fold cannot open. The jaw 2 now moves backwardly to the position shown in Fig. 5, the jaw 3 remaining stationary. To prevent the jaw 2 from moving or displacing the strip

60 while moving backwardly, I raise the said jaw from the strip by means of tracks 14 14, Figs. 1, 9, and 10, which are movable vertically in slots in the table and are raised before the jaw 2 commences to move backwardly, their upper edges projecting above the table, as shown in Fig. 10. The jaw 2 rests on said tracks during its backward movement, the jaw being thus raised from the strip 60. When the jaw reaches the end of its backward movement, the tracks 14 are lowered and permit the feeding-face of the jaw to again bear on the strip 60 during the forward movement of the jaw. The roughened bottom face of the jaw 2 therefore constitutes a four-motioned feed. The tracks 14 14 are sufficiently far apart to permit the strip 60 to pass between them. The said tracks are mounted on arms 15, which are pivoted at 16 to the frame of the machine and bear on cams 17 on the operating-shaft 18, hereinafter described, said cams being timed to raise and lower the tracks 14, as above described. The next forward movement of the jaw 2 forms another fold, the operation being repeated until the entire strip is plaited. Each fold is pushed forward by the descent of the jaw 3, the series of folds being thus moved forward step by step. The first fold of the series bears against a slide 19, Figs. 1, 2, 5, and 6, which rests loosely on the table and is moved along the latter by the series of folds. The slide 19 may be a strip of wood, the length of which is preferably equal to or greater than the width of the strip 60. The slide is guided in its movements to keep its fold-supporting edge parallel with the folds, by means of a shank 20, Figs. 1 and 2, affixed to the slide and projecting therefrom, said shank having a block 21 on its under side, the edges of which are in close proximity to the proximate edges of two of a series of lower guide-bars 22, affixed to the supporting-frame, said bars guiding the block and preventing the slide 19 from swinging out of parallelism with the folds. The upper surfaces of the said lower guide-bars 22 are flush with the upper surface of the table, said lower guide-bars constituting extensions of the table, so that the series of folds can move off from the table and onto the said lower guide-bars.

The folds are confined against vertical displacement by a fold-confiner 23, which is a plate resting loosely on ears 24 24, said ears being adjustable, as hereinafter described, to support the confiner at different heights, according to the width of the folds. The under side of the confiner is supported by said ears in position to bear lightly on the apexes of the folds, and the inner end of the confiner is held by springs 25 against the inclined face of the jaw 3, so that the confiner controls each fold as soon as it is formed, the confiner being moved outwardly by the inclined side of the jaw when the latter descends and inwardly by the springs when the jaw rises, so that the inner end of the confiner is always in contact with the jaw. To the confiner are affixed upper guide-bars 26, which project from the outer end of the confiner and are parallel with the lower guide-bars 22, their lower edges being flush with the lower side of the confiner. The folds as they emerge from between the table and confiner pass on between the lower guide-bars 22 and the upper guide-bars 26, the slide 19 also passing between said lower and upper bars. The spaces between the lower and upper guide-bars are open at the outer ends of said guide-bars, so that the slide and the series of folds can be removed from between the lower and upper guide-bars, as hereinafter described.

I provide a receiver which is detachably connected with the guide-bars and receives the slide and the plaited strip when they are moved onto the lower guide-bars and is adapted to be removed from the machine with the slide and strip and to confine the strip while it is being subjected to a steam-bath for the purpose of setting the folds. The receiver, as shown in Figs. 1, 2, and 3, comprises a series of lower bars 27, a series of upper bars 28, and a cross-bar 29, connecting the outer ends of the upper and lower bars. The upper bars 28 are separated from the lower bars 27 by spaces equal to the width of the folds, and said spaces are open at the inner ends of the bars to permit the entrance of the slide and plaited strip between the bars. The bars of the receiver are placed below the connecting cross-bar, and, as shown in Fig. 6, the lower bars are separated from the upper bars by spacing-blocks 30, there being an open space under the cross-bar 29 for the passage of the shank 20 of the slide 19. The spacing-blocks 30 arrest the slide 19 when the latter reaches said blocks.

The lower bars 27 of the receiver rest on a cross-bar 31, Fig. 2, affixed to the outer ends of the lower guide-bars 22, and on studs 32, Figs. 1 and 2, affixed to two of the lower guide-bars near their inner ends. Stops 33, affixed to the lower bars of the receiver, abut against the cross-bar 31 and prevent the receiver from being pushed outwardly while receiving the plaited strip. When the entire strip has been plaited and forced into the receiver, the slide 19 bears against the spacing-blocks 30 between the upper and lower receiver-arms, and the rear end of the plaited strip is secured by a follower, which may be a bar of wood inserted between the arms of the follower behind the strip and held against the latter by pins inserted in orifices 34, formed in two pairs of the receiver-arms. The receiver may now be removed from the machine and held in a steam-bath until the creases of the folds are made sufficiently permanent, the open outer ends of the spaces between the lower and upper guide-bars 22 and 26 permitting the withdrawal of the slide and the plaited strip from between said lower and upper guide-bars. The strip 60 is guided to the jaws 2 3 and put under the desired tension

by means of rods 35 35 and 38, located above the outer end of the table, and edge-guides 36 36, which are mounted on said rods and are movable toward and from each other on the rods to accommodate the width of the strip 60. The rods 35 35 are affixed to stationary ears 37, projecting above the table, and the rod 38 is detachably engaged with slots 39, Figs. 5 and 6, in the edge-guides 36 and is therefore removable to facilitate the engagement of the strip with the rods.

I will now describe the mechanism for operating the jaws and for varying the width of the plaits.

The operating-shaft 18 is journaled in bearings on the frame and is rotated by a driving-shaft 40 through gears 41 42, connecting the two shafts. Said driving-shaft may be rotated either by hand or by power. In the latter case the pulley 43, through which power is applied, should be connected with the driving-shaft by a suitable clutch, so that the pulley may be made loose when it is desired to stop the machine.

44 44 represent cams affixed to the operating-shaft and coöperating with trundle-rolls 45 45, mounted on arms 46 46, which are affixed to a rock-shaft 47, journaled in bearings on the frame. The arms 46 are provided with slides 48, which are movable in guides on the said arms and receive trunnions 49, Figs. 2 and 11, formed on the ends of the jaw 2. The slides 48 are secured to the arms 46 by headed studs or screws 480, Fig. 11, engaged with the slides and passing through slots 481 in the arms 46. A spring 50, affixed at one end to the frame and at the other end to an arm 51 on the rock-shaft 47, normally forces the arms 46 toward the perimeter of the cams 44, so that when the cams are rotated the arms 46 are oscillated by the action of the cams and spring, the jaw 2 being moved horizontally by the oscillations of the arms. The pivotal connection between the jaw and the slides 48 and the sliding connection between said slides and the arms 46 enables the strip-feeding under face of the jaw 2 to bear uniformly on the strip 60 when moving forward and to be raised with the tracks 14 and to bear uniformly on the raised tracks when moving backward.

The extent of the yielding backward movement of the jaw 2 caused by the spring 50 may be varied by means of an adjustable stop adapted to coöperate with the rock-shaft arm 51 in limiting the backward movement of the jaw 2. Said stop is shown in Figs. 5 and 6 as a stud 52, formed on a bar 53, which is movable lengthwise of the machine, the stud 52 being arranged to abut against the rock-shaft arm 51, and thus determine the extent of backward movement of said arm, as shown in Fig. 5. The bar 53 is affixed to the central portion of a cross-bar or handle 54, which extends across one end of the frame, as shown in Fig. 1. To the end portions of said handle are affixed the outer ends of bars 55 55, the inner ends of which are pivoted at 56 to the end bars of a sliding frame composed of end bars 57 and cross-bars 58. The adjustable ears 24, which support the presser 23, are formed on the said end bars 57 and have inclined slots 59, through which pass studs 61, affixed to the frame of the machine.

When the handle 54 is moved inwardly or toward the table, the stop-stud 52 is moved to shorten the movement of the jaw 2, thus decreasing the width of the folds, and at the same time the ears 24 are moved to cause the inclined slots 59 and studs 61 to lower the ears, and thus adapt the confiner 23 to the decreased width of the folds. When the handle 54 is moved outwardly, the stop-stud 52 is moved to lengthen the movement of the jaw 2 and increase the width of the folds, and the ears 24 are raised to correspondingly raise the confiner 23. The bars 53 and 55 are provided with notches 62, adapted to engage a detent-bar 63 on the frame of the machine to hold the stop-stud 52 and the ears 24 in different positions. Said notches may be marked to indicate the width of fold produced by the engagement of the different notches with the detent. 64 64, Figs. 1 and 4, represent locking-cams, which are pivoted at 65 65 to the forward end of the table, and are formed to engage the bars 55 and hold the notches therein in engagement with the detent 63. When said cams are displaced, the bars 53 55 may be raised out of engagement with the detent.

The jaw 2 is pressed downwardly by springs 66 66, each secured at one end to a fixed bracket 67 and bearing at its other end on the jaw. The springs are held under tension when the machine is in operation by means of levers 68, pivoted to the brackets 67 and bearing on the upper sides of the springs. When the levers are turned to release the springs, the jaw 2 is loosened and may be freely raised from the table to permit the insertion of the strip 60 under the jaw at the commencement of the operation, the slides 48 on the arms 46 permitting a free upward movement of the jaw 2.

The movements of the wedge-shaped jaw 3 are effected by the following mechanism:

69 69 represent cams affixed to the operating-shaft 18.

70 70 represent arms pivoted at 71 to the frame of the machine, their outer ends being connected by links 72 72 with the slides 8 8, which support the jaw 3. Springs 73, affixed to the frame and bearing downwardly on the arms 70, press trundle-rolls 74 on said arms downwardly against the cams 69, said springs coöperating with the cams in moving the jaw 3 up and down.

The jaw 3 may be raised and held in a raised position while the strip 60 is being inserted under it by means of cams 75, affixed to a shaft 76, journaled in bearings on the frame of the machine and provided with a crank 77, by which it may be turned to cause the cams to raise the slides 8 and jaw 3, the lower ends

of the slides resting on the cams. Each cam 75 has stops 750 and 751 at its ends, and a notch 752 to receive a projection 753, Fig. 11, when the cams are turned to raise the slides.

I do not limit myself to the details of mechanism here shown, and the same may be variously modified without departing from the spirit of my invention.

For convenience I hereinafter refer to the jaw 2 as the "pushing-jaw" and to the jaw 3 as the "abutment-jaw."

Having thus explained the nature of the invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is—

1. A plaiting-machine comprising a table, an abutment-jaw movable toward and from the table, operating mechanism for said jaw adapted to raise and depress the jaw and to hold it stationary after each depression, a pushing-jaw movable parallel with the table toward and from the abutment-jaw, said jaws having opposed pressing-faces, and operating mechanism for the pushing-jaw adapted to move the same toward the abutment-jaw while the latter is held in its depressed position, whereby a plait or fold is raised and subjected to pressure between said pressing-faces.

2. A plaiting-machine comprising a table, an abutment-jaw movable toward and from the table, operating mechanism for said jaw adapted to raise and depress the jaw and to hold it stationary after each depression, a pushing-jaw movable parallel with the table toward and from the abutment-jaw, said jaws having opposed pressing-faces, and operating mechanism for the pushing-jaw adapted to move the same toward the abutment-jaw while the latter is held in its depressed position, whereby a plait or fold is raised and subjected to pressure between said pressing-faces, the abutment-jaw having a strip-clamping lower edge which holds the strip against the table during the fold raising and pressing operation and during the backward movement of the pushing-jaw.

3. A plaiting-machine comprising a table, an abutment-jaw movable toward and from the table, operating mechanism for said jaw adapted to raise and depress the jaw and to hold it stationary after each depression, a pushing-jaw movable parallel with the table toward and from the abutment-jaw, said jaws having opposed pressing-faces, and operating mechanism for the pushing-jaw adapted to move the same toward the abutment-jaw while the latter is held in its depressed position, whereby a plait or fold is raised and subjected to pressure between said pressing-faces, the abutment-jaw having an inclined rear face which joins the lower edge of the pressing-face at an acute angle, whereby the abutment-jaw is caused during its downward movement to feed forward the fold last formed.

4. A plaiting-machine comprising a table, an abutment-jaw movable toward and from the table, operating mechanism for said jaw adapted to raise and depress the jaw and to hold it stationary after each depression, a pushing-jaw movable parallel with the table toward and from the abutment-jaw, said jaws having opposed pressing-faces, and operating mechanism for the pushing-jaw adapted to move the same toward the abutment-jaw while the latter is held in its depressed position, whereby a plait or fold is raised and subjected to pressure between said pressing-faces, the last-mentioned operating mechanism having provisions for holding the pushing-jaw out of contact with the work during the backward movement of the jaw, and in contact with the work during the forward movement of the jaw.

5. A plaiting-machine comprising a table, an abutment-jaw movable toward and from the table, operating mechanism for said jaw adapted to raise and depress the jaw and to hold it stationary after each depression, a pushing-jaw movable parallel with the table toward and from the abutment-jaw, said jaws having opposed pressing-faces, operating mechanism for the pushing-jaw adapted to move the same toward the abutment-jaw while the latter is held in its depressed position, whereby a plait or fold is raised and subjected to pressure between said pressing-faces, the abutment-jaw having an inclined rear face which joins the lower edge of the pressing-face at an acute angle, whereby the abutment-jaw is caused during its downward movement to feed forward the fold last formed, a fold-confiner located over the table and coöperating therewith in confining a series of folds, a slide movable between the table and confiner for yieldingly supporting the outer end of the series of folds, a detachable receiver adapted to receive the slide and folds and having means for confining the same when the receiver is removed from the machine, and means for detachably securing said receiver in its fold-receiving position.

6. A plaiting-machine comprising a table, fold-forming, pressing, and feeding mechanism coöperating with the table, a fold-confiner located over the table and coöperating therewith in confining a series of folds, a slide movable between the table and confiner for yieldingly supporting the outer end of a series of folds, lower and upper guide-bars constituting respectively extensions of the table and confiner and adapted to guide the slide and the series of folds outwardly from the table and confiner, the spaces between said lower and upper bars being open at the outer ends of the bars to permit the withdrawal of the slide and folds, and a detachable receiver composed of upper and lower bars, and adapted to rest loosely on supports on the guide-

bars, the spaces between the upper and lower receiver-bars being open at the inner ends of said bars to receive the slide and folds, and closed at the outer ends to arrest the slide.

7. A plaiting-machine comprising a table, a pushing-jaw movable substantially parallel with the table, an abutment-jaw having a movement toward and from the table, said jaws having opposed pressing-faces, a fold-confiner located over the table and adjustable toward and from the same, adjustable supports for said confiner, mechanism for reciprocating said pushing-jaw, said mechanism having provisions for varying the length of movement of the pushing-jaw, and means for adjusting the confiner-supports simultaneously with the adjustment of the movement of the pushing-jaw.

8. A plaiting-machine comprising a table, a pushing-jaw movable substantially parallel with the table, an abutment-jaw having a movement toward and from the table, mechanism for reciprocating the pushing-jaw, said mechanism having provisions for giving said jaw a yielding backward movement, an adjustable stop adapted to limit the said backward movement, a fold-confiner located over the table and adjustable toward and from the same, adjustable supports for said confiner, and connections between said supports and the stop, whereby the supports and stop may be adjusted simultaneously.

9. A plaiting-machine comprising a table, a pushing-jaw movable substantially parallel with the table, an abutment-jaw having a movement toward and from the table, said jaws having opposed pressing-faces, mechanism for reciprocating the pushing-jaw, said mechanism having provisions for giving the jaw a yielding backward movement, an adjustable stop adapted to limit said backward movement, a fold-confiner located over the table, supports for said confiner having inclines coöperating with fixed bearings whereby the supports are adjusted vertically when moved on said bearings, bars connected with said stop and supports, a handle connected with said bars whereby the stops and supports may be adjusted simultaneously, and means for locking the bars in different positions.

10. A plaiting-machine comprising a table, a pushing-jaw movable substantially parallel with the table, oscillatory arms having slides pivotally engaged with the ends of said jaw, means for oscillating said arms, springs pressing downwardly on said jaw, and means for releasing said springs to permit the raising of the jaw from the table.

11. A plaiting-machine comprising a table, a pushing-jaw, an abutment-jaw movable toward and from the table, said jaws having opposed pressing-faces, slides movable in fixed guides and pivotally connected with the ends of the said abutment-jaw, means for reciprocating said slides, and means for yieldingly pressing the lower edge of the abutment-jaw toward the strip-feeding jaw.

12. A plaiting-machine comprising a table, a pushing-jaw, an abutment-jaw movable toward and from the table, said jaws having opposed pressing-faces, slides movable in fixed guides and pivotally connected with the ends of the said abutment-jaw, means for reciprocating said slides, and means for raising the slides and holding the same with the abutment-jaw in a raised position.

In testimony whereof I have affixed my signature in presence of two witnesses.

DANIEL L. CHANDLER.

Witnesses:
WARREN H. ATWOOD,
JAMES W. GILDAY.