

No. 724,084.

PATENTED MAR. 31, 1903.

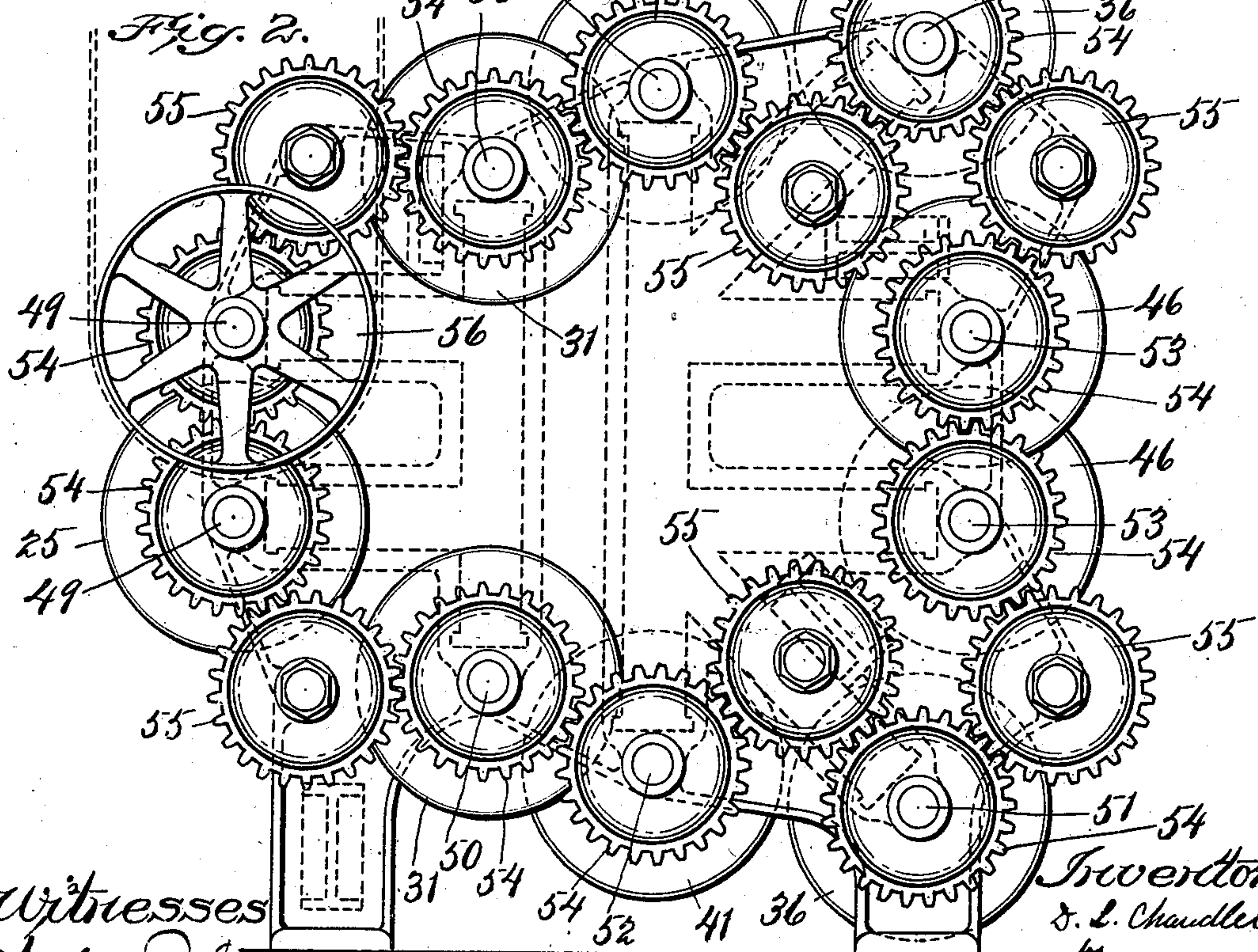
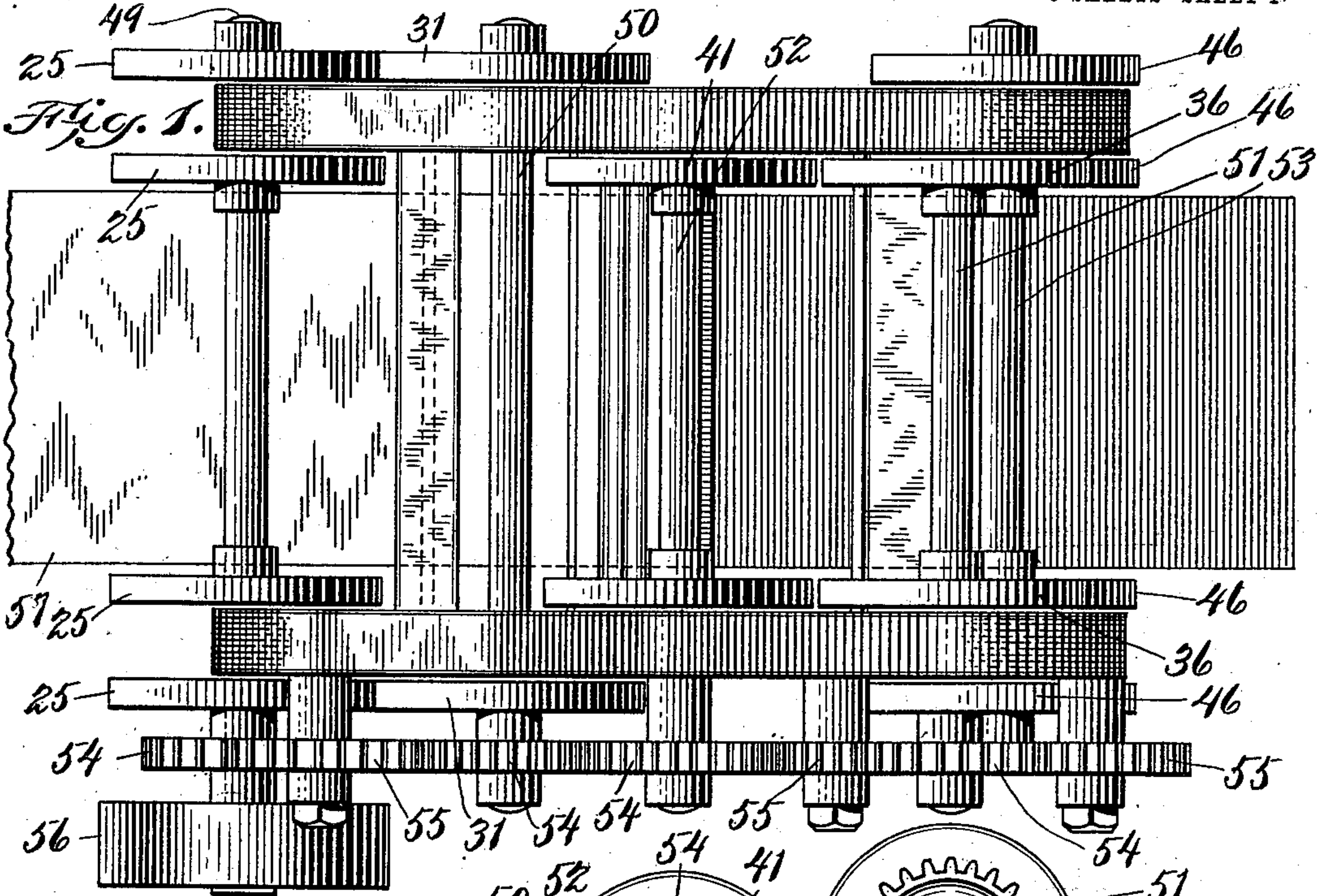
D. L. CHANDLER.

MACHINE FOR PLAITING HEAVY WEBS.

APPLICATION FILED SEPT. 29, 1902.

NO MODEL.

5 SHEETS—SHEET 1.



Witnesses
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No. 724,084.

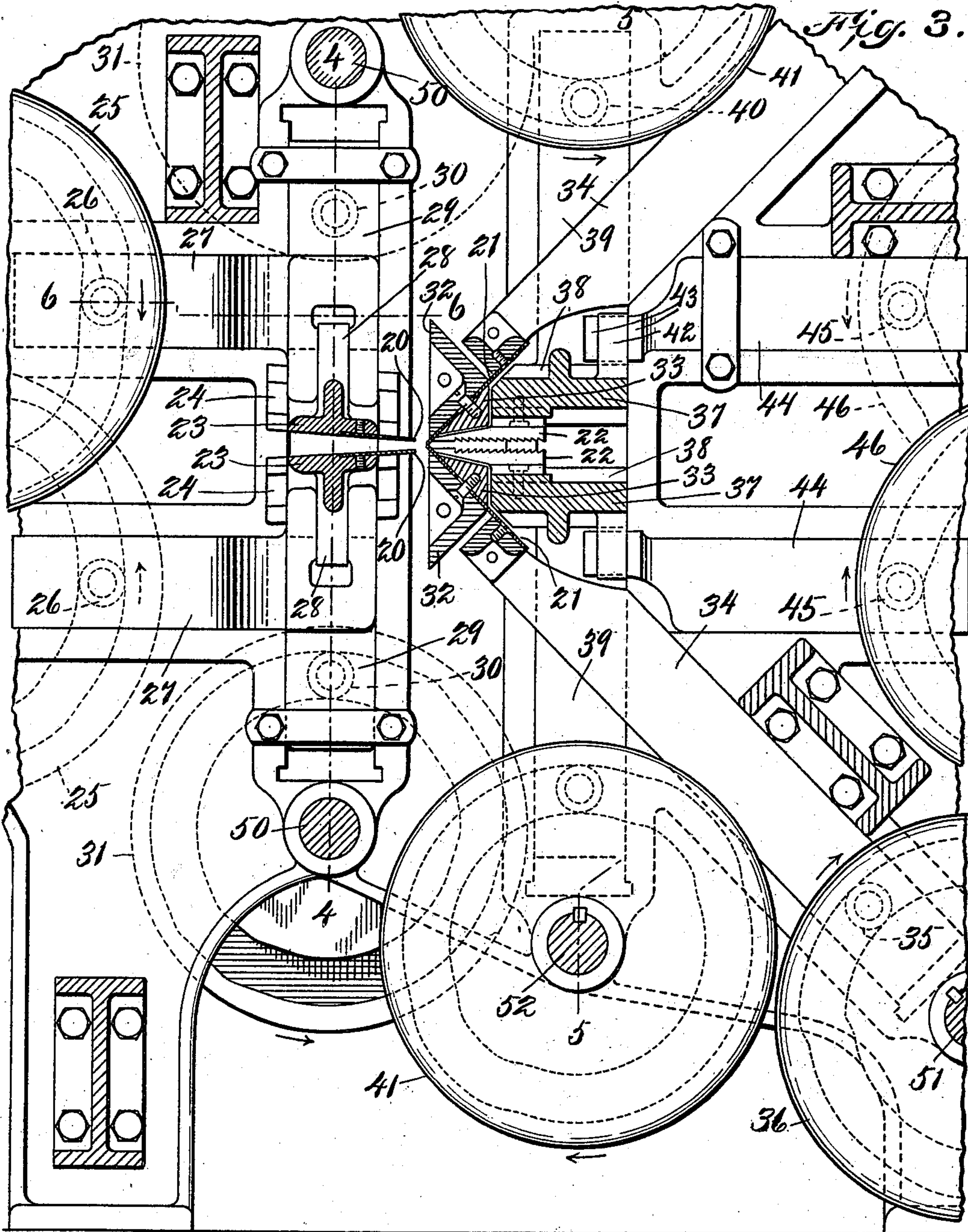
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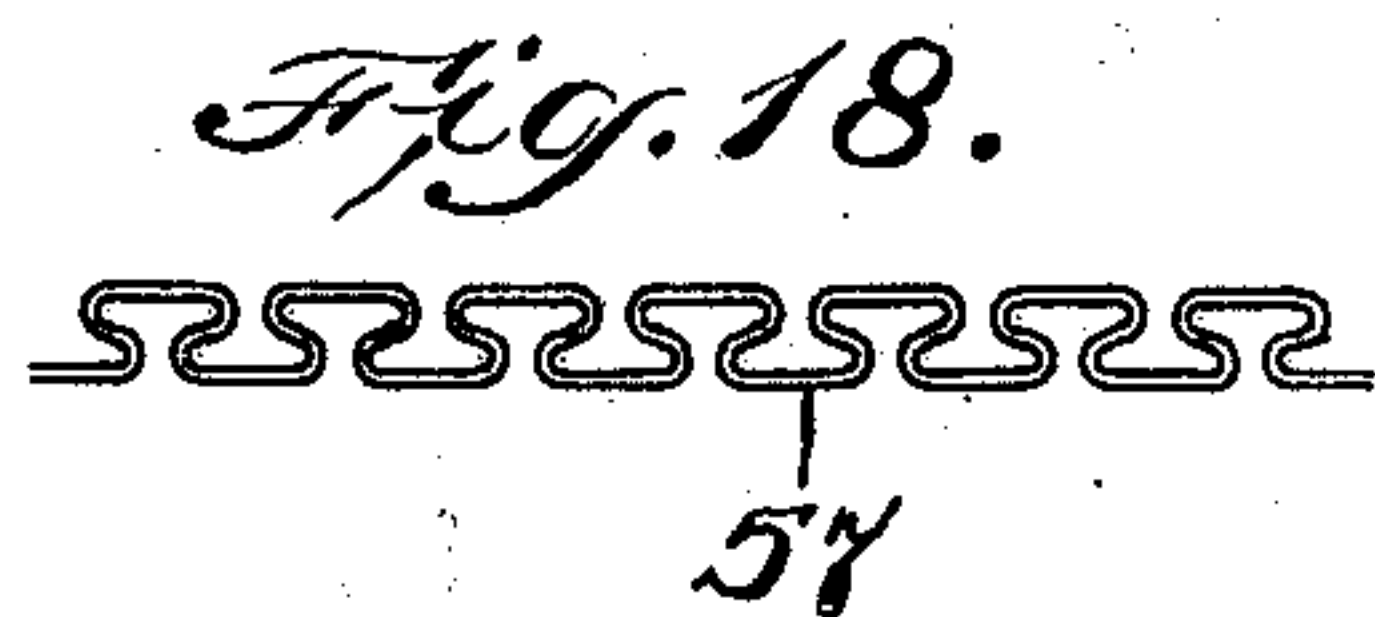
APPLICATION FILED SEPT. 29, 1902.

NO MODEL.

6 SHEETS—SHEET 2.



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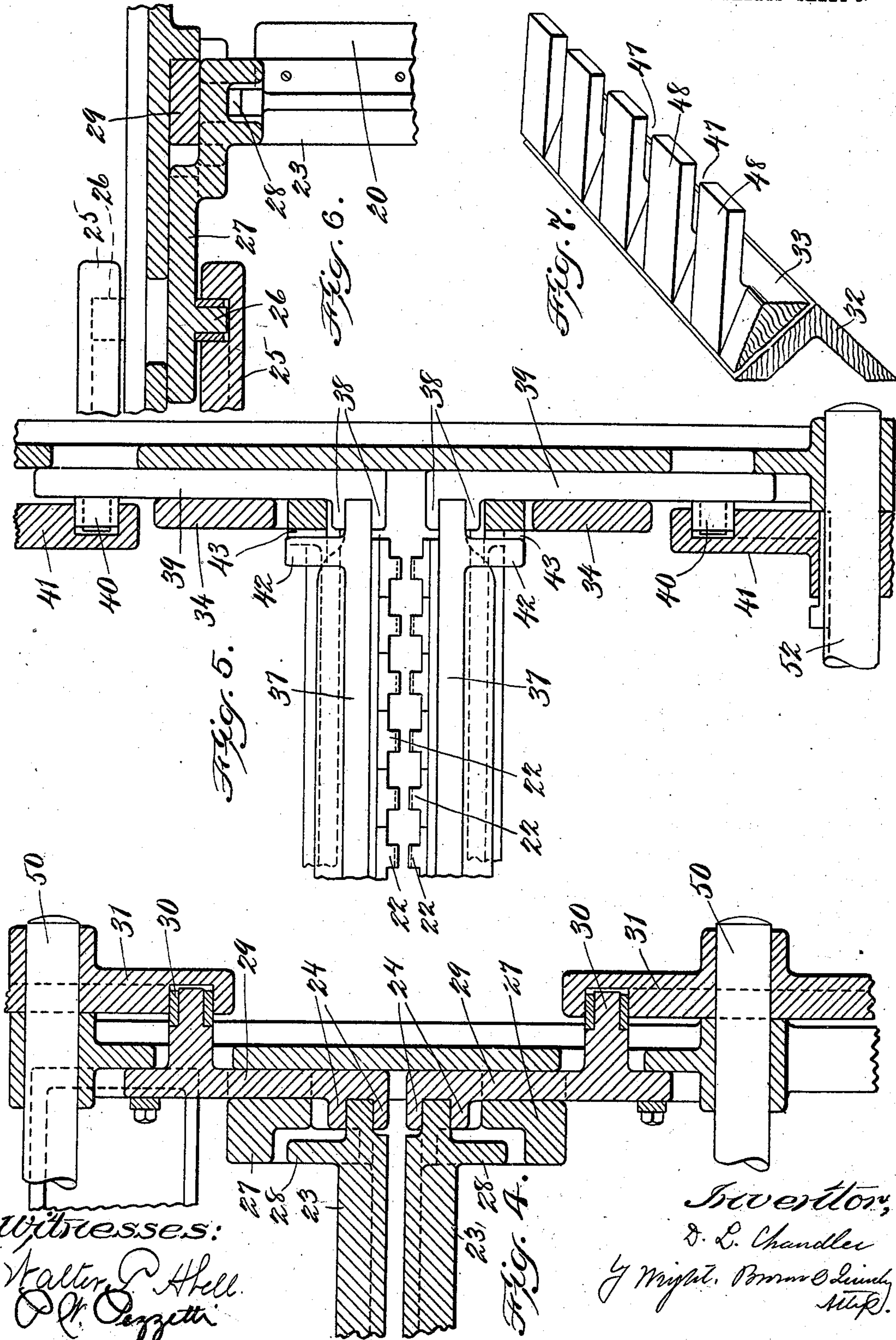
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5 SHEETS—SHEET 3.



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PATENTED MAR. 31, 1903.

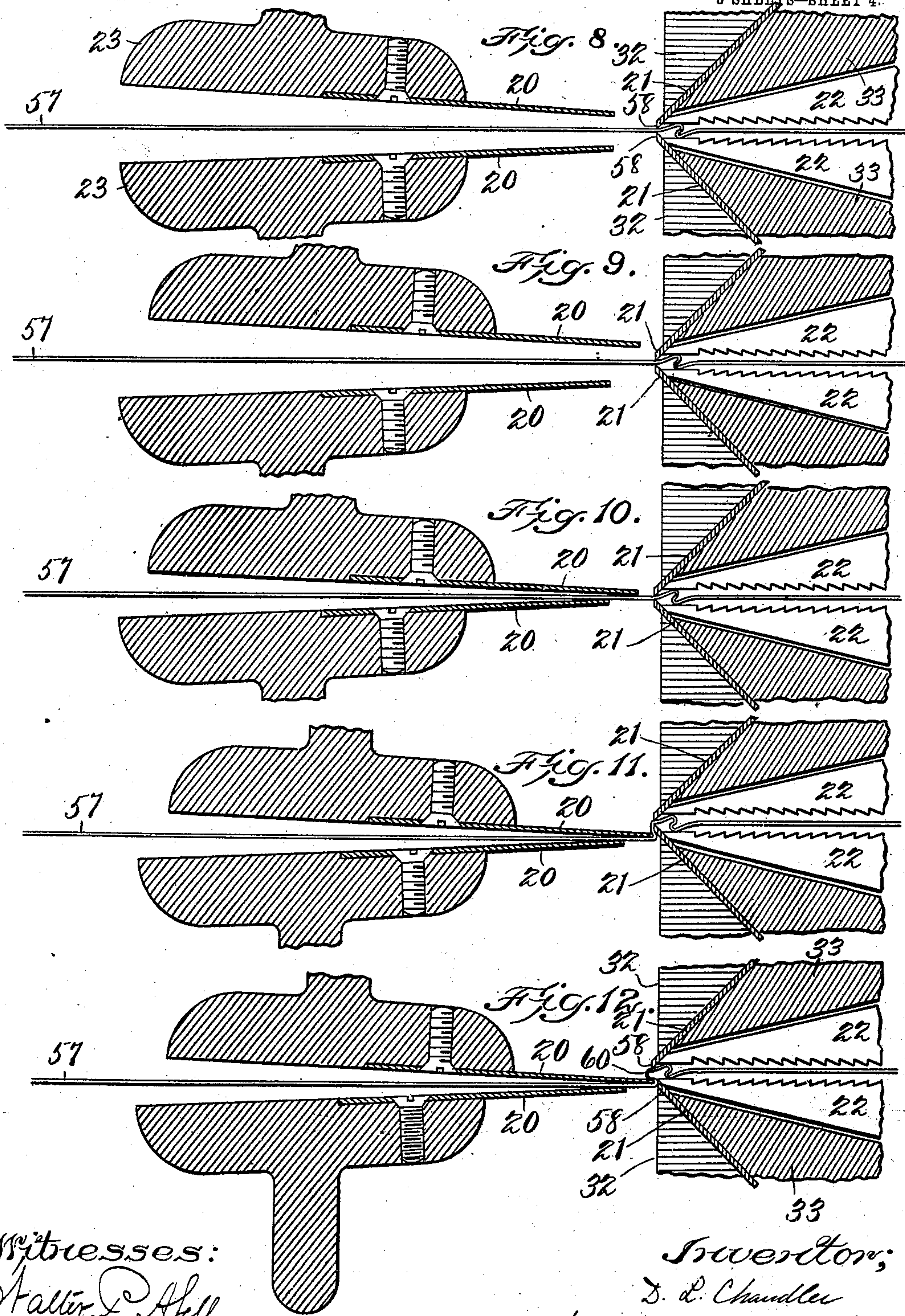
D. L. CHANDLER.

MACHINE FOR PLAITING HEAVY WEBS.

APPLICATION FILED SEPT. 29, 1902.

NO MODEL.

5 SHEETS—SHEET 4.



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No. 724,084.

D. L. CHANDLER.

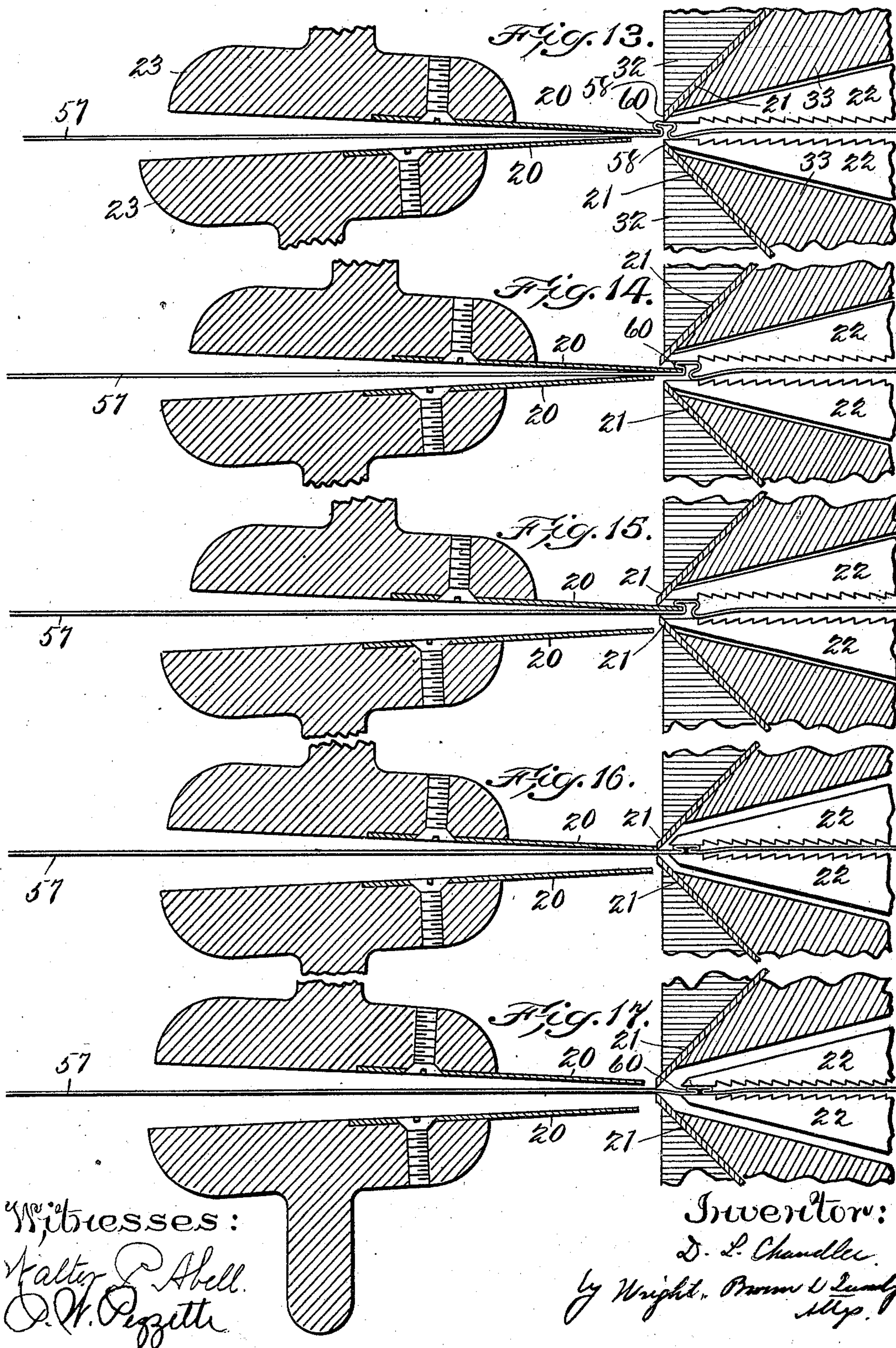
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APPLICATION FILED SEPT. 29, 1902.

NO MODEL.

5 SHEETS—SHEET 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

DANIEL L. CHANDLER, OF AYER, MASSACHUSETTS.

MACHINE FOR PLAITING HEAVY WEBS.

SPECIFICATION forming part of Letters Patent No. 724,084, dated March 31, 1903.

Application filed September 29, 1902. Serial No. 125,235. (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 Machines for Plaiting Heavy Webs, of which the following is a specification.

This invention relates to a machine for plaiting heavy webs, such as thick paper or so-called "board," its particular object being to provide a practical apparatus for producing a box-plaited paper packing or carpet-lining, the said product being an improved substitute for corrugated-paper packing.

The embodiment of my invention shown in the drawings employs two opposed alternately-operating plaiting units, each consisting of a diagonally-mounted forming-blade or former and a folder, which folds the web around the edge of the forming-blade to make the plait. An indefinite succession of prone or knife plaits alternating in direction is formed, the plaited web resembling a box-plaited fabric. As each plait is formed around the forming-blade the latter is withdrawn from the plait transversely thereof—that is to say, longitudinally with respect to the feed of the fabric—and the formed plait is projected by a further advance of the plaiter into the space between the two plaiting units, where the plaited web is engaged on opposite sides by a pair of toothed reciprocating feeders and drawn forward the distance of one plait. As the plaiter retreats the two former-blades advance upon the web just back of the formed plait and insure the clearing of the plait from the folder, so that the latter in retreating does not drag the web with it and undo its own work. This tendency to unfold after being plaited or folded is particularly noticeable with heavy webs. Such tendency, however, as well as the extreme difficulty of properly plaiting a heavy stiff fabric or web, is overcome by the mechanism of my invention.

Of the accompanying drawings, Figure 1 represents a top plan view of a plaiting-machine constructed in accordance with my invention. Fig. 2 represents a side elevation thereof. Fig. 3 represents a longitudinal vertical section showing the working parts of the machine. Fig. 4 represents a section on line

4 4 of Fig. 3. Fig. 5 represents a section on line 5 5 of Fig. 3. Fig. 6 represents a section on line 6 6 of Fig. 3. Fig. 7 represents a detail perspective view of the lower former-blade guide and feed-bar channels. Figs. 8 to 17, inclusive, represent sectional views showing the plaiting and feeding members in various positions. Fig. 18 represents an edge view of the product of the machine.

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

In the drawings, 20 20 represent the upper and lower plaiter-blades or folders. 21 21 represent the upper and lower former-blades, and 22 22 represent the upper and lower toothed feed-dogs.

The folders are mounted upon folder-carriers 23 23, mounted in guides 24 24, which stand at a slight inclination from the horizontal, so as to converge the forward edges of the folders. The folders are thus guided for a slightly-inclined movement, which I will term the "horizontal" movement, which is imparted by cams 25 25, having grooves acting upon studs 26 26, mounted upon horizontal slides 27 27, which engage vertical projections 28 28 on the folder-carriers 23. The guides 24 are formed upon vertical slides 29 29, carrying studs 30 30, which operate in the grooves of cams 31 31, whereby a vertical movement is imparted to the folders.

The former-blades or formers 21 21 are mounted diagonally between fixed guide-pieces 32 33 and receive a diagonal reciprocating movement from two inclined slides 34 34, carrying studs 35 35, (of which the lower one only is shown in Fig. 3,) operating in grooves in cams 36 36.

The feeders 22 are two series of toothed blocks mounted in the tapered throat formed between the former-blades 21 and distributed at regular intervals along two feed-bars 37 37. The latter are supported in horizontal guides 38 38 upon vertical slides 39 39, carrying studs 40 40, which operate in the grooves of two cams 41 41, whereby a vertical movement is imparted to the feeders. The feed-bars 37 are formed with vertical lugs 42 42, engaged by guides 43 43 upon two horizontal slides 44 44, carrying studs 45 45, operating in the grooves of two cams 46 46, whereby horizontal movement is imparted to the feeders.

The several blocks or sections of the feeders operate in channels 47 47, located between sections or blocks 48 48, attached to the guide-pieces 33 and forming upper and lower abutments or work-tables, between which the plaited web is fed, the lower table being shown in Fig. 7.

As best shown in Figs. 1 and 2, the cams 25 are mounted upon two shafts 49 49, the cams 31 upon shafts 50 50, the cams 36 upon shafts 51 51, the cams 41 upon shafts 52 52, and the cams 46 upon shafts 53 53. The several shafts are provided with gears 54 54, which are connected in train directly and by intermediates 55 55, so that power applied to one of the shafts 49 by means of a pulley 56 will rotate the whole series of shafts.

The operation of the working parts will be understood from an inspection of Figs. 8 to 17. Fig. 8 shows the two folders 20 20 separated and retracted from the locality of the ends of the former-blades 21. The former-blades are projected upon the web 57, and their working ends extend beyond the vertical faces of the guide-pieces 32 32, which act as abutments for the folders 20, as hereinafter explained. In forming a plait with the upper folder 20 the latter moves forward, as shown in Fig. 9, and then downward, as shown in Fig. 10, to meet the lower folder 20, which has moved upwardly until the web is gripped and held between the two. The two folders, with the upper one in advance, then move downwardly, and the upper folder 20 folds the web around the projected working edge of the lower former-blade 21, as shown in Fig. 11. The lower former-blade then retracts until its vertical face 58, which constitutes an abutment-face, is flush with the vertical face of the lower guide member 32. The portion of the web which is bent over the edge of the upper folder 20 is held between said edge and the abutment formed by the guide member and former-blade, as shown in Fig. 12. The upper former-blade 21, which has remained projected until now, then retracts until its abutment-face is flush with that of the upper guide-piece 32, and the folders 20 rise until the upper folder is in alignment with the space between the open feed-dogs 22. The folders 20 advance until the plait 60 has been projected into the space between the feed-dogs, and the upper former-blade 21 descends onto the upper folder behind the plait, as shown in Fig. 14, so as to clear the plait upon the retraction of the folder or prevent said folder from dragging the web back with it and unfolding the plait. The lower former-blade 21 also rises onto the web, as shown in Fig. 15, and assists in holding the latter stationary during the retraction of the folder 20, which is shown as having taken place in Fig. 16. A continuation of the movement of the lower former-blade to its fully-projected position brings it even with the upper former-blade. The feed-dogs 22 come together upon the plaited web, as indicated in Fig. 16,

and retreat therewith, as indicated in Fig. 17, feeding the web forward a distance of one plait. The folder-blades 20 retreat to the starting position shown in Fig. 8, and an opposite plait is then formed by the lower folder 20 around the upper former 21, the movements of the parts being a repetition of that described. The alternate operation of the two folding units results in a continuous succession of oppositely-directed prone, flat, or knife plaits in the web, giving the latter the appearance of a box-plaited fabric, as indicated in Fig. 18.

I believe myself to be the first to provide a successful automatic machine for forming a continuous succession of prone plaits in a web of a heavy stiff character. I do not restrict myself to the exact construction herein shown, as considerable variation in construction may be made without departing from the principles involved. A heavy paper or "board" fabric plaited as shown in Fig. 18 affords an extremely soft and resilient carpet-lining or packing for glass bottles, &c., superior to the well-known corrugated-paper packing. Although it is the primary object of my invention to produce a box-plaited web, as shown in Fig. 18, it is obvious that different styles of plaiting may be produced by a suitable arrangement of the cams.

I claim—

1. In a machine for plaiting heavy webs, a folder, a former, and mechanism for causing the folder to fold a succession of prone plaits in the web around the former and for withdrawing the former from each plait transversely thereof as it is formed.

2. In a machine for plaiting heavy webs, a folder mounted for a reciprocating plait-producing movement and a former around which the folder forms the plait mounted for movement in a path inclined to that of the folder.

3. In a machine for plaiting heavy webs, a folder, a former, mechanism for causing the folder to form a succession of prone plaits around the former and for withdrawing the former from each plait transversely thereof as it is formed, and an abutment to cooperate with the folder after the withdrawal of the former.

4. In a machine for plaiting heavy webs, a folder, an abutment cooperating therewith, and a reciprocatory former having an abutment-face which coincides with that of the abutment in the retracted position of said former.

5. In a machine for plaiting heavy webs, a former, a reciprocatory folder adapted to fold a succession of prone plaits around the former, and a device for clearing the formed plaits from the folder on the retracting movement of the latter.

6. In a machine for plaiting heavy webs, two alternately-operating opposed plaiting units each comprising a former and a folder arranged to fold a succession of prone plaits around said former.

7. In a machine for plaiting heavy webs,
two opposed plaiting units each comprising
a former and a folder arranged to fold a suc-
cession of prone plaits around said former,
5 and means for causing the two formers to co-
act in clearing the formed plaits from the
folders.

8. In a machine for plaiting heavy webs,
two opposed plaiting units each comprising
10 a former and a folder, said formers being in-

clined to form a tapering throat, and two co-
acting reciprocatory feeders operating in said
throat.

In testimony whereof I have affixed my sig-
nature in presence of two witnesses.

DANIEL L. CHANDLER.

Witnesses:

GEORGE G. OSGOOD,
FRANK S. BULKELEY.