

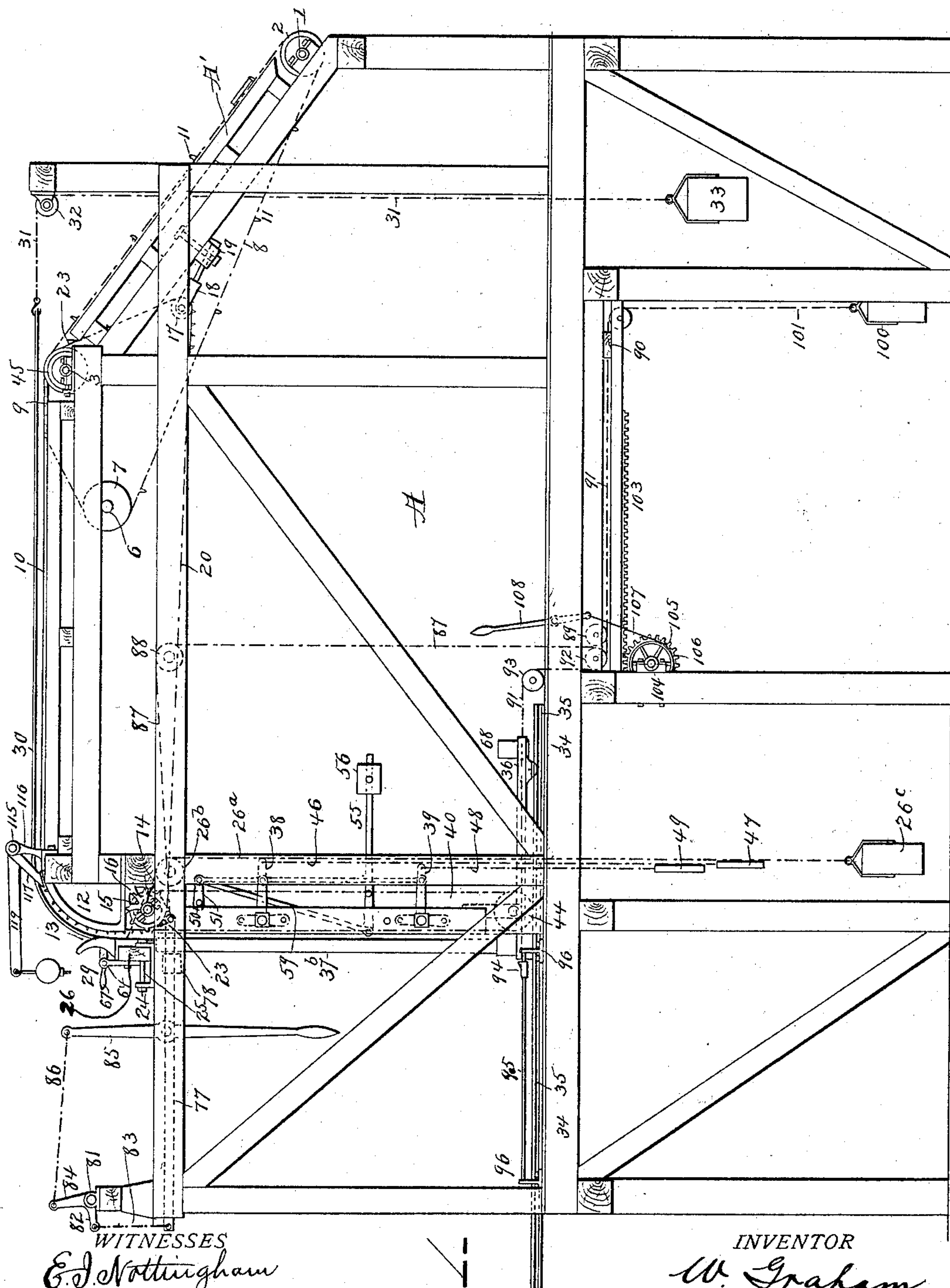
(No Model.)

6 Sheets—Sheet 1.

W. GRAHAM.  
LUMBER STACKING APPARATUS.

No. 604,169.

Patented May 17, 1898.



WITNESSES

E. J. Nottingham  
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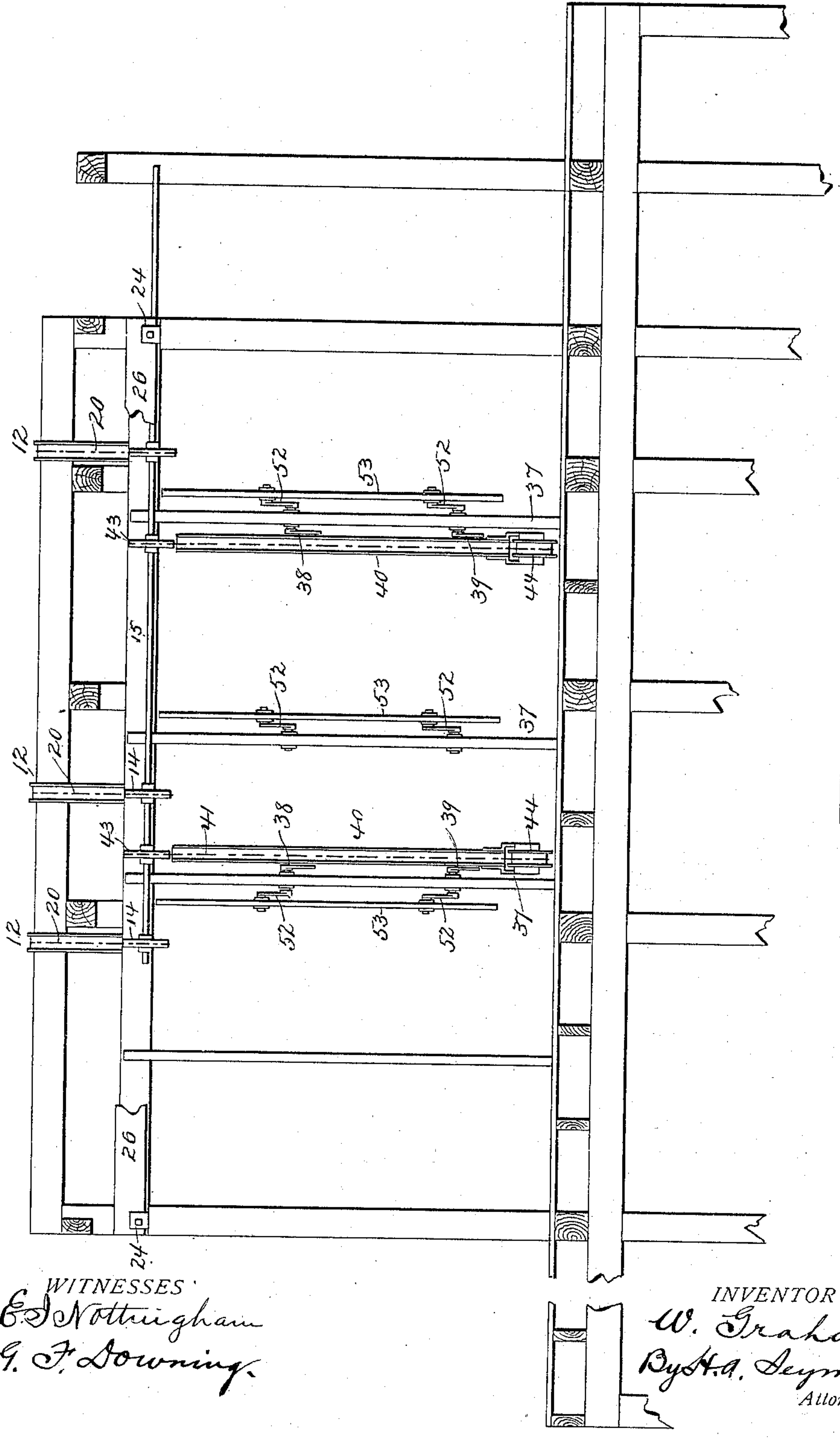
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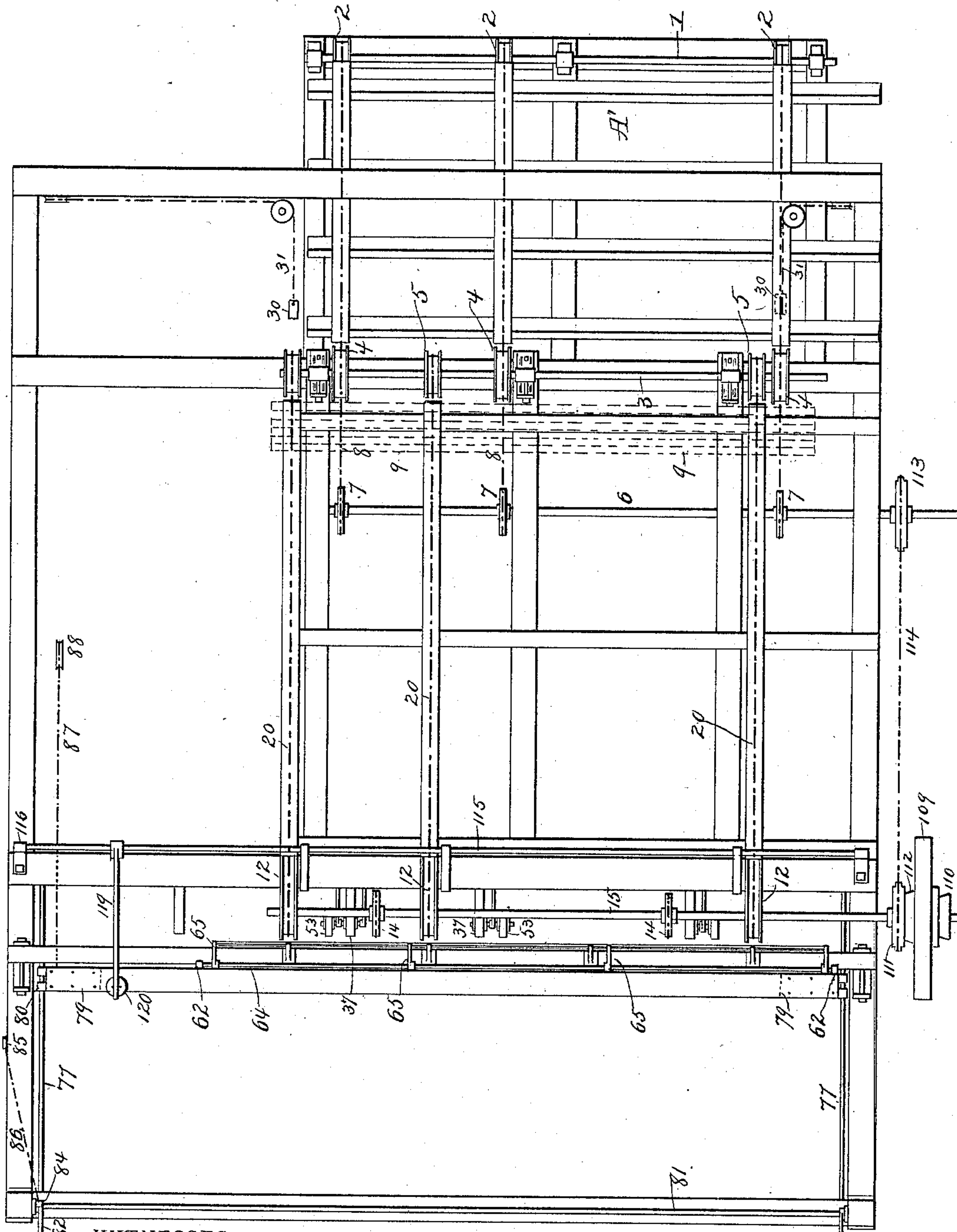
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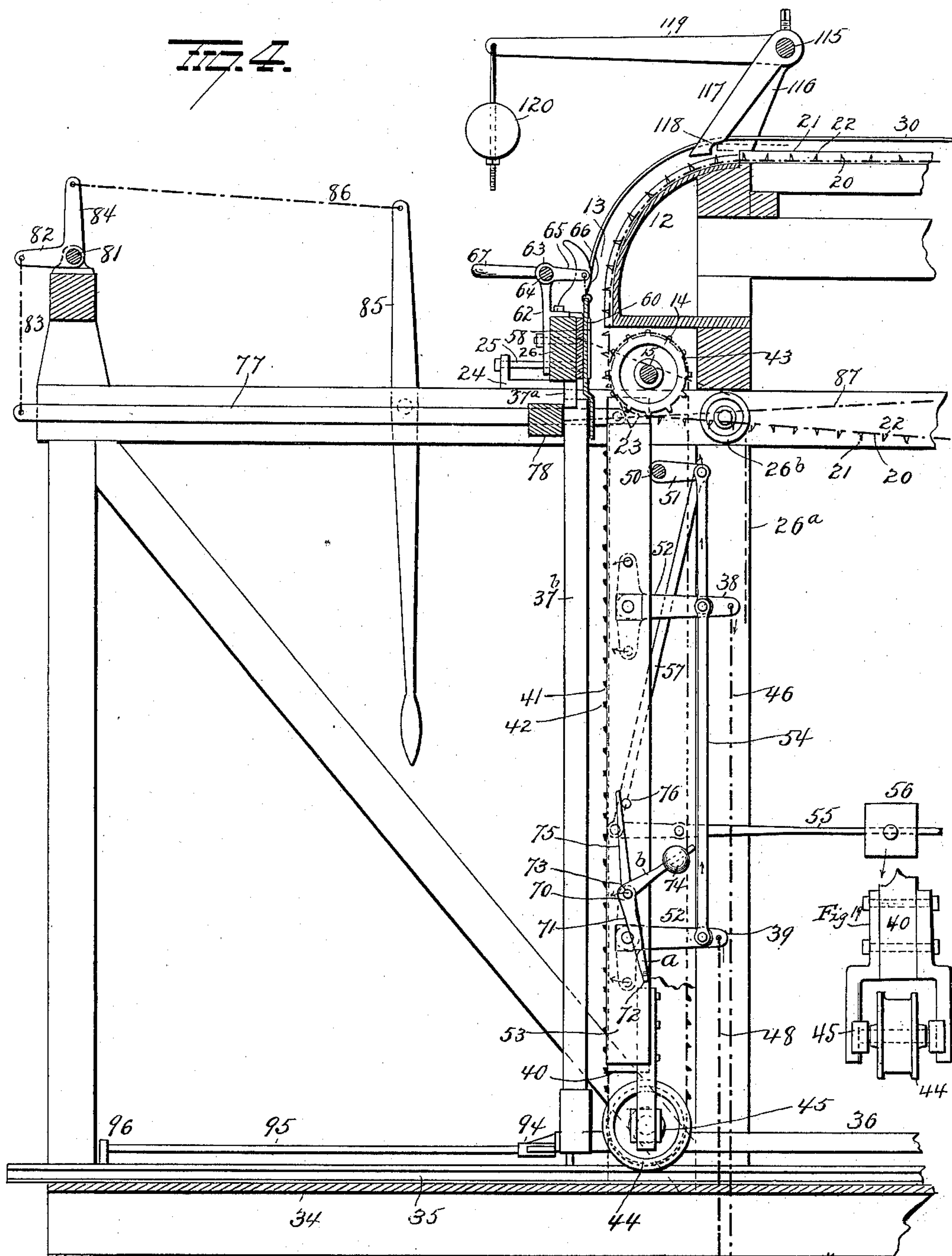
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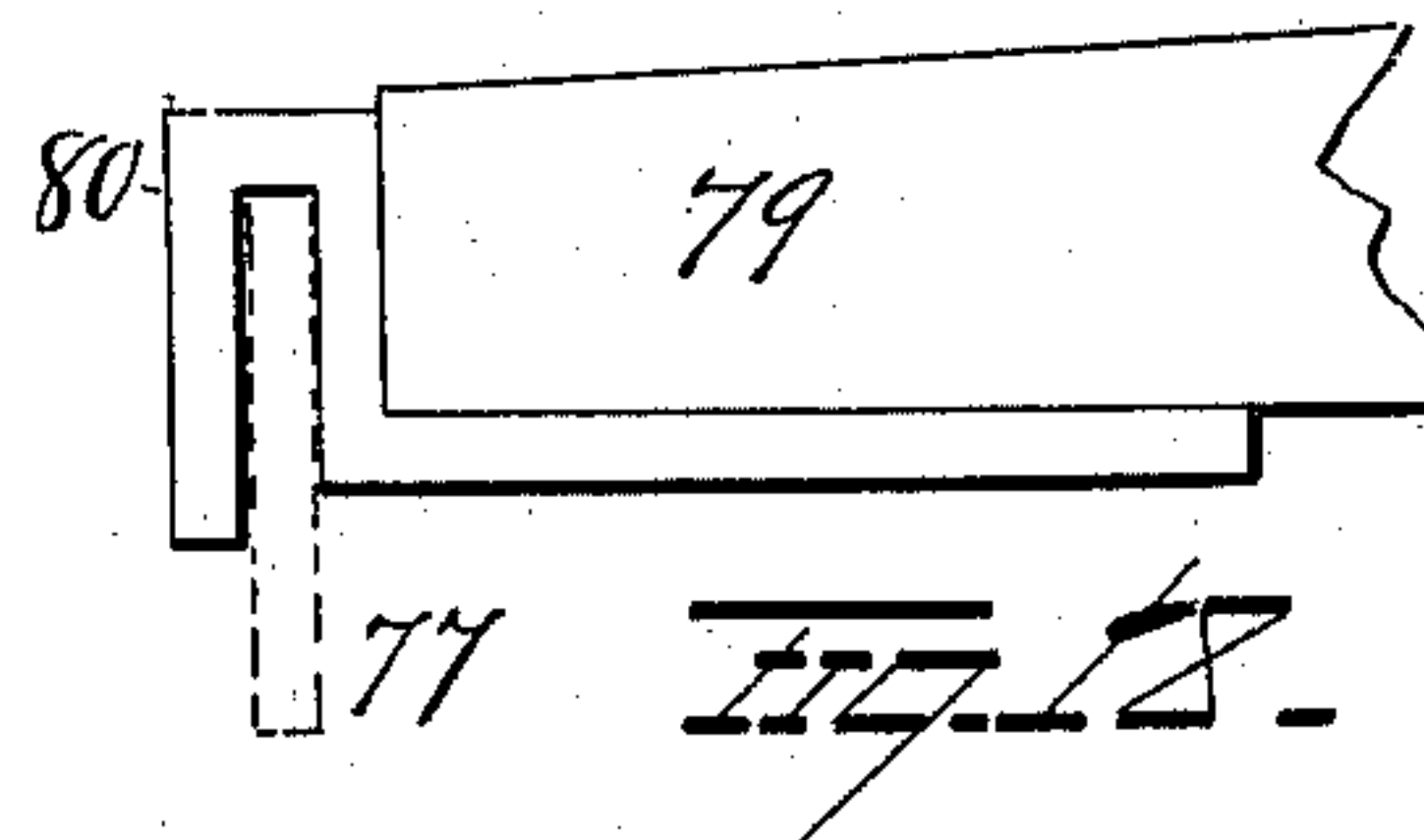
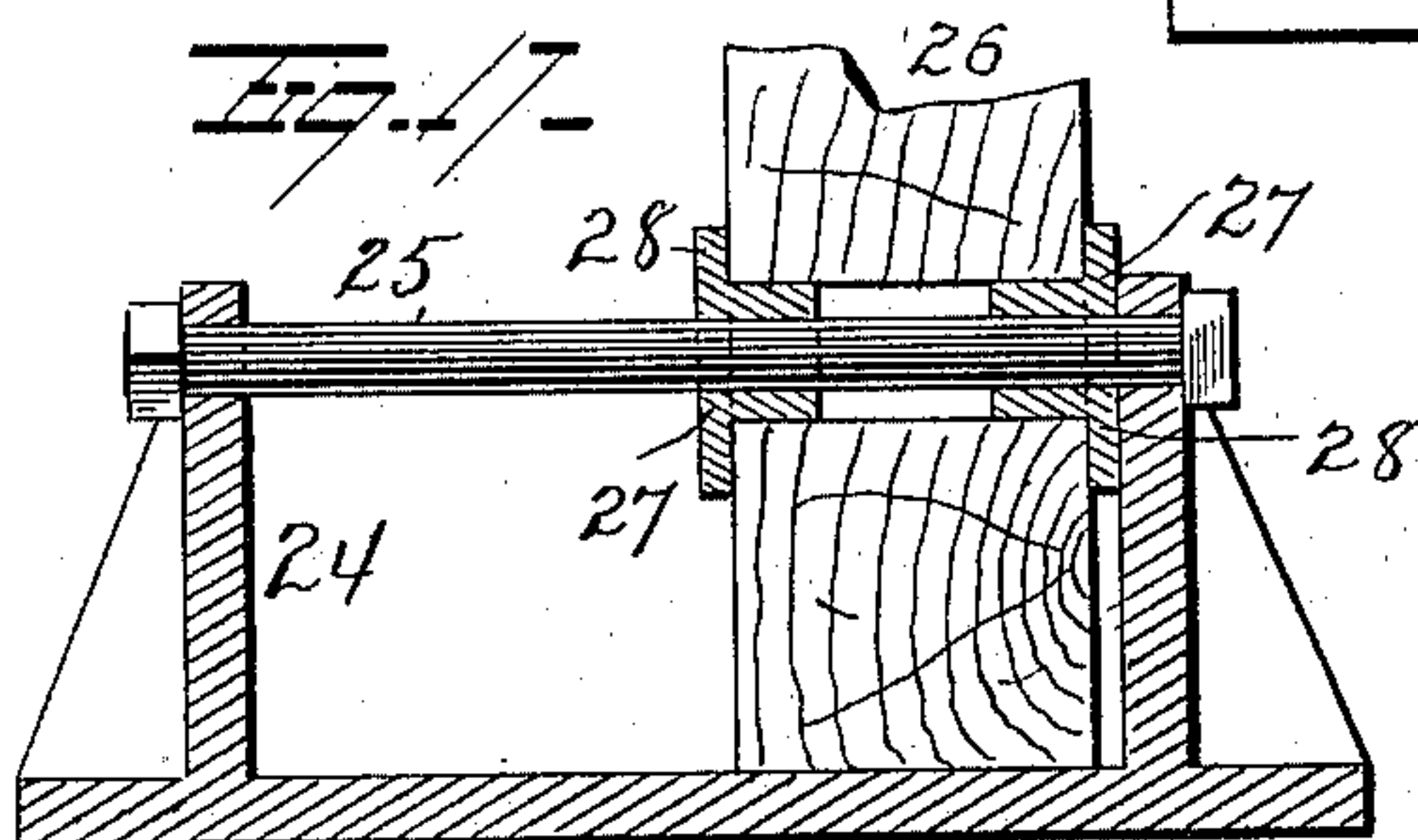
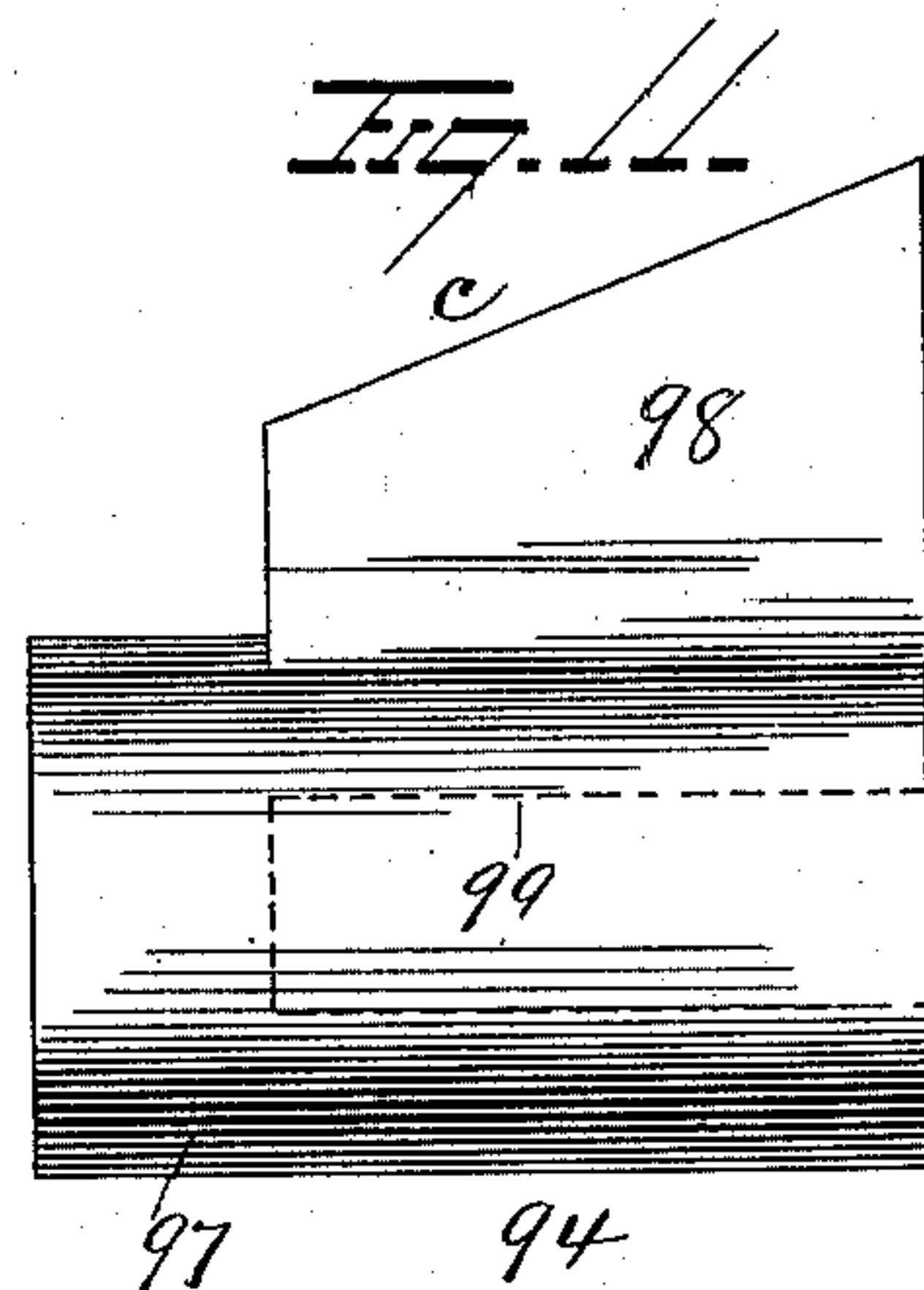
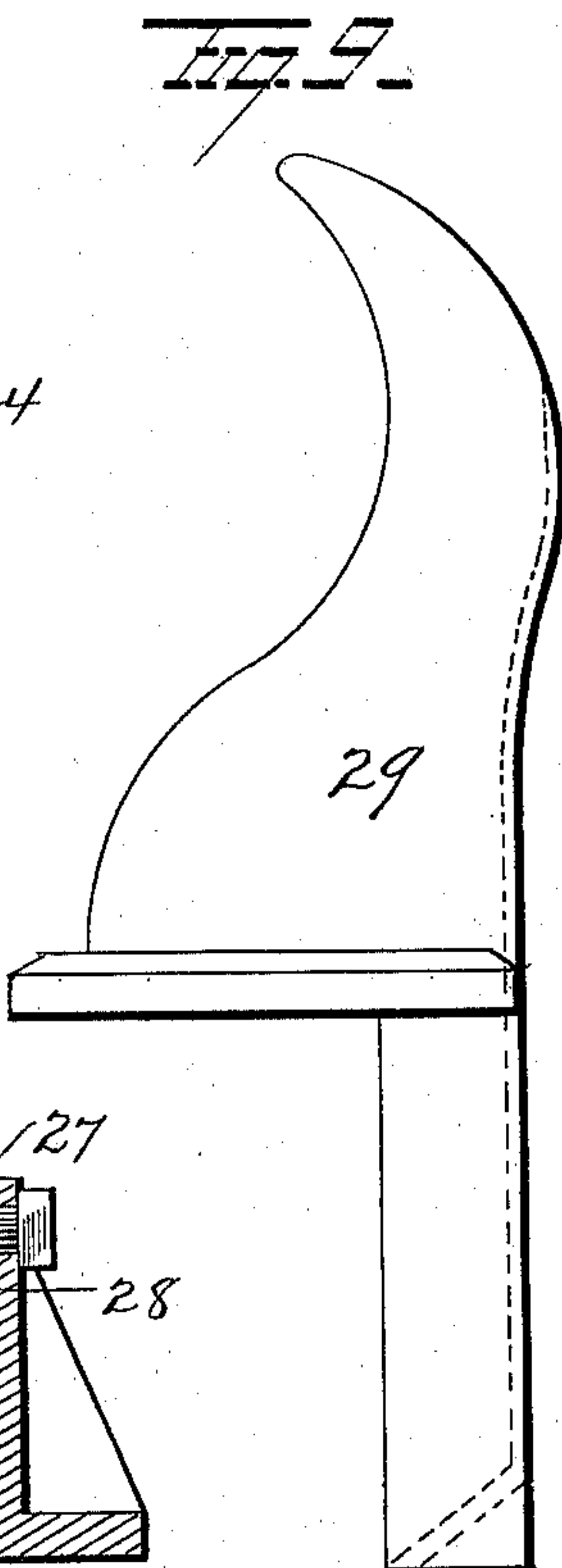
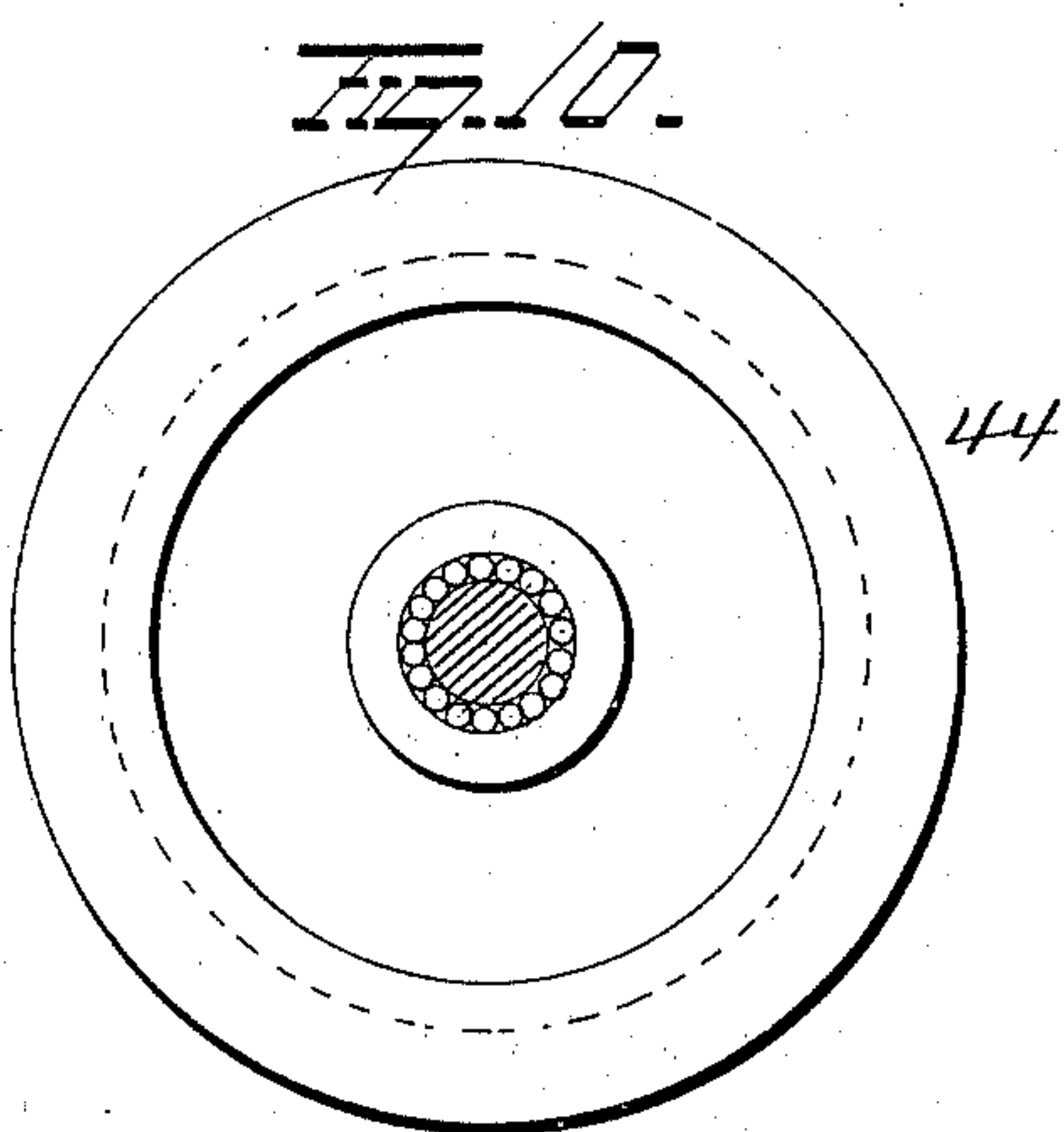
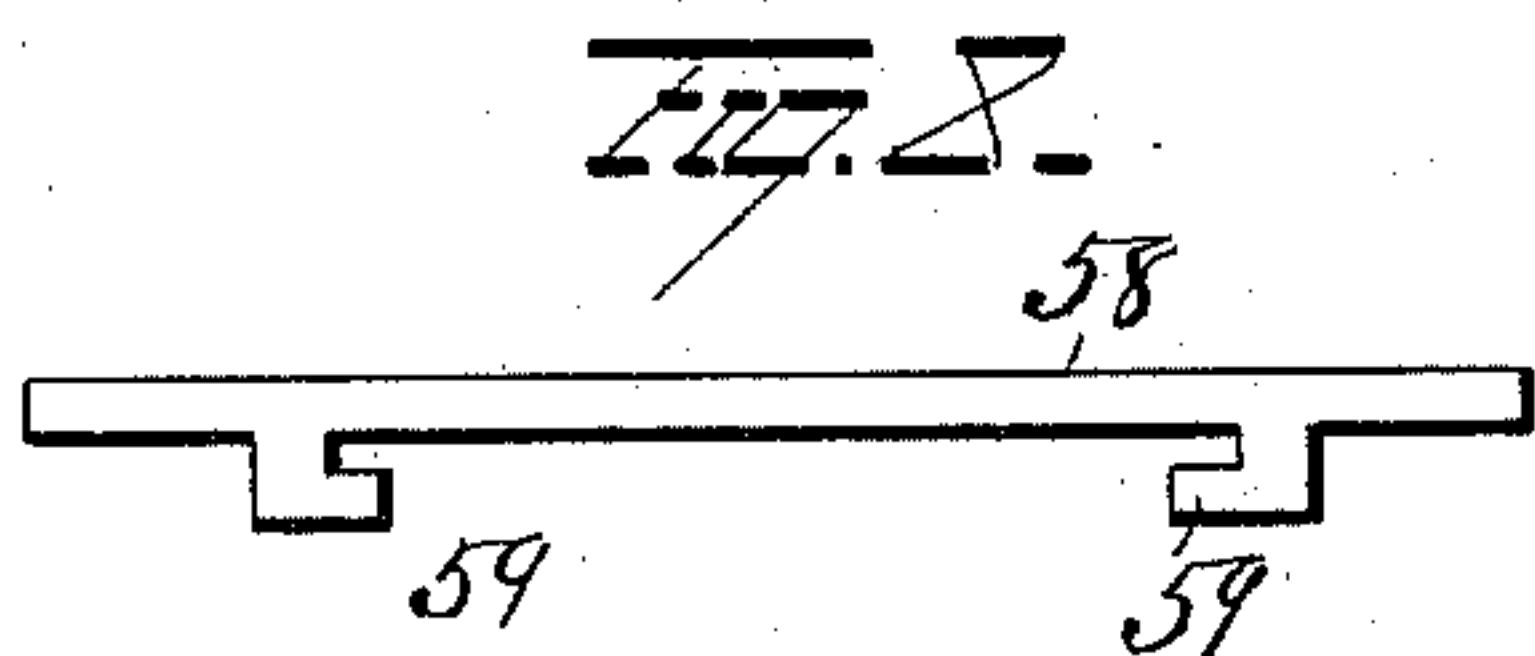
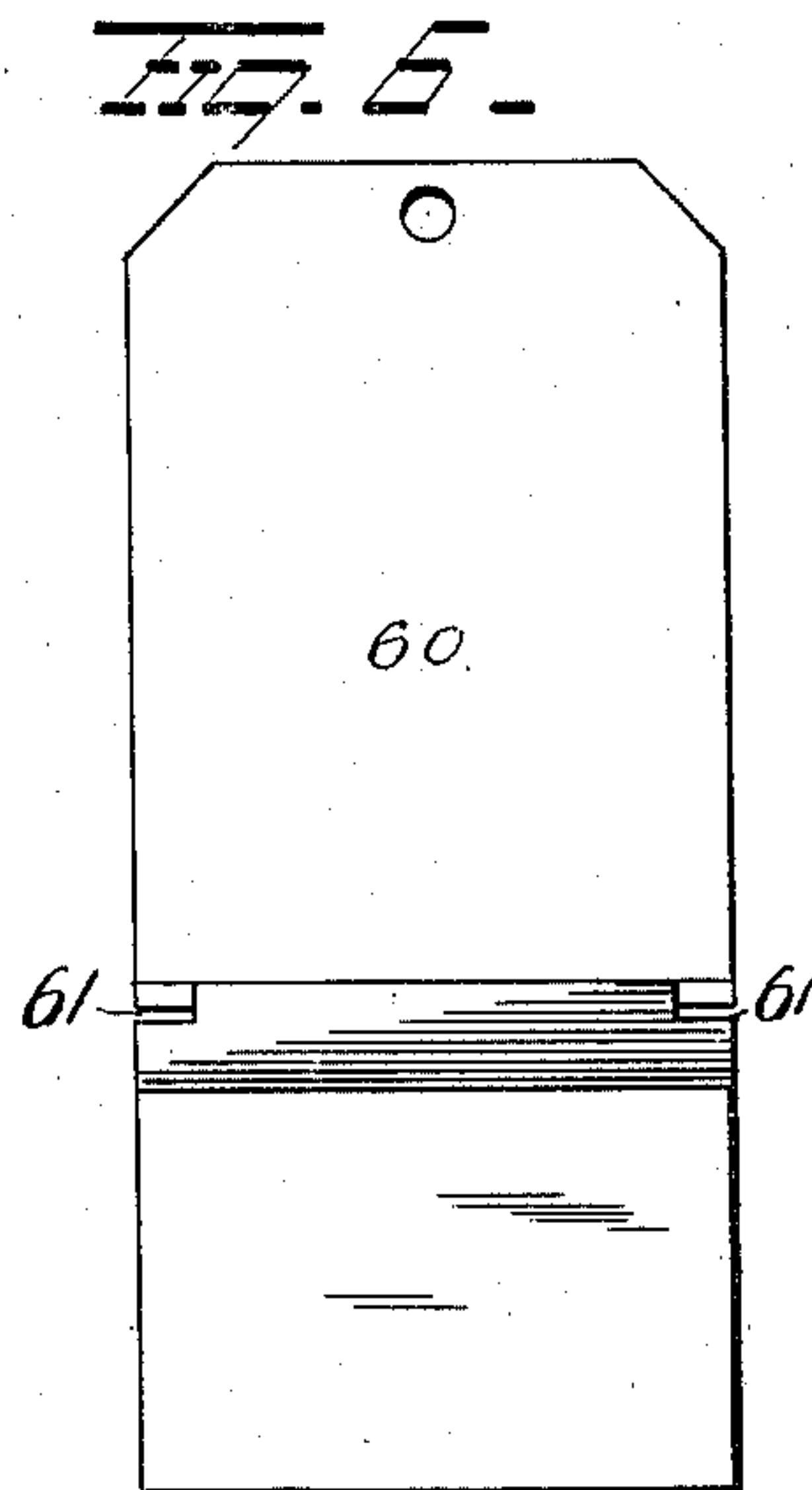
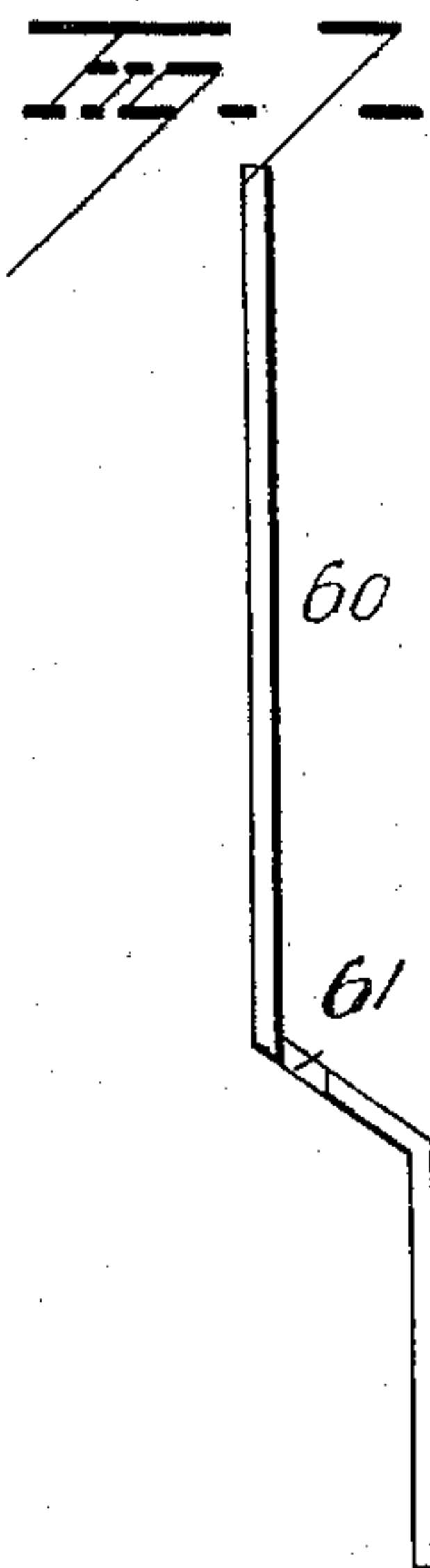
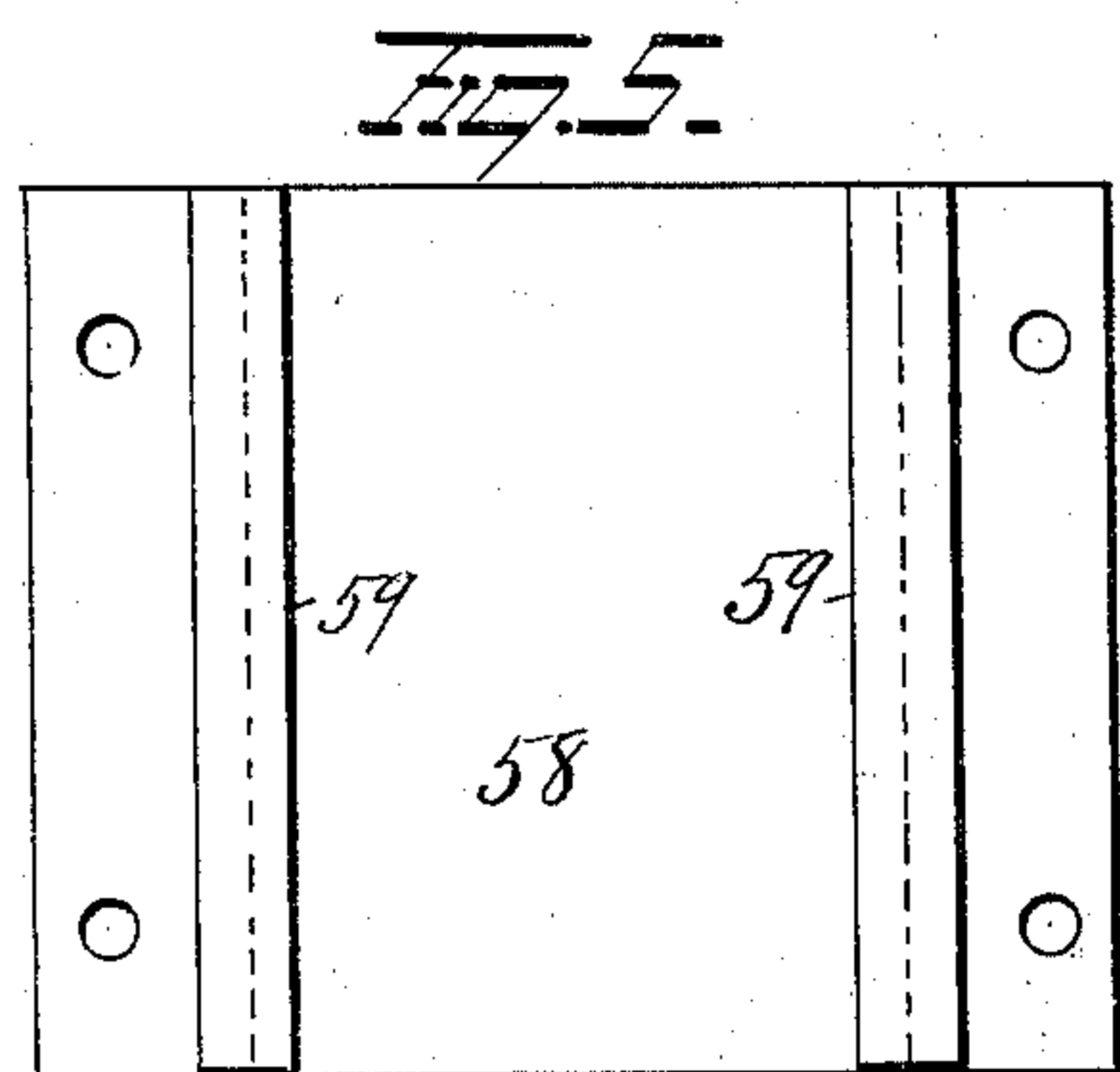
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Fig. 12.

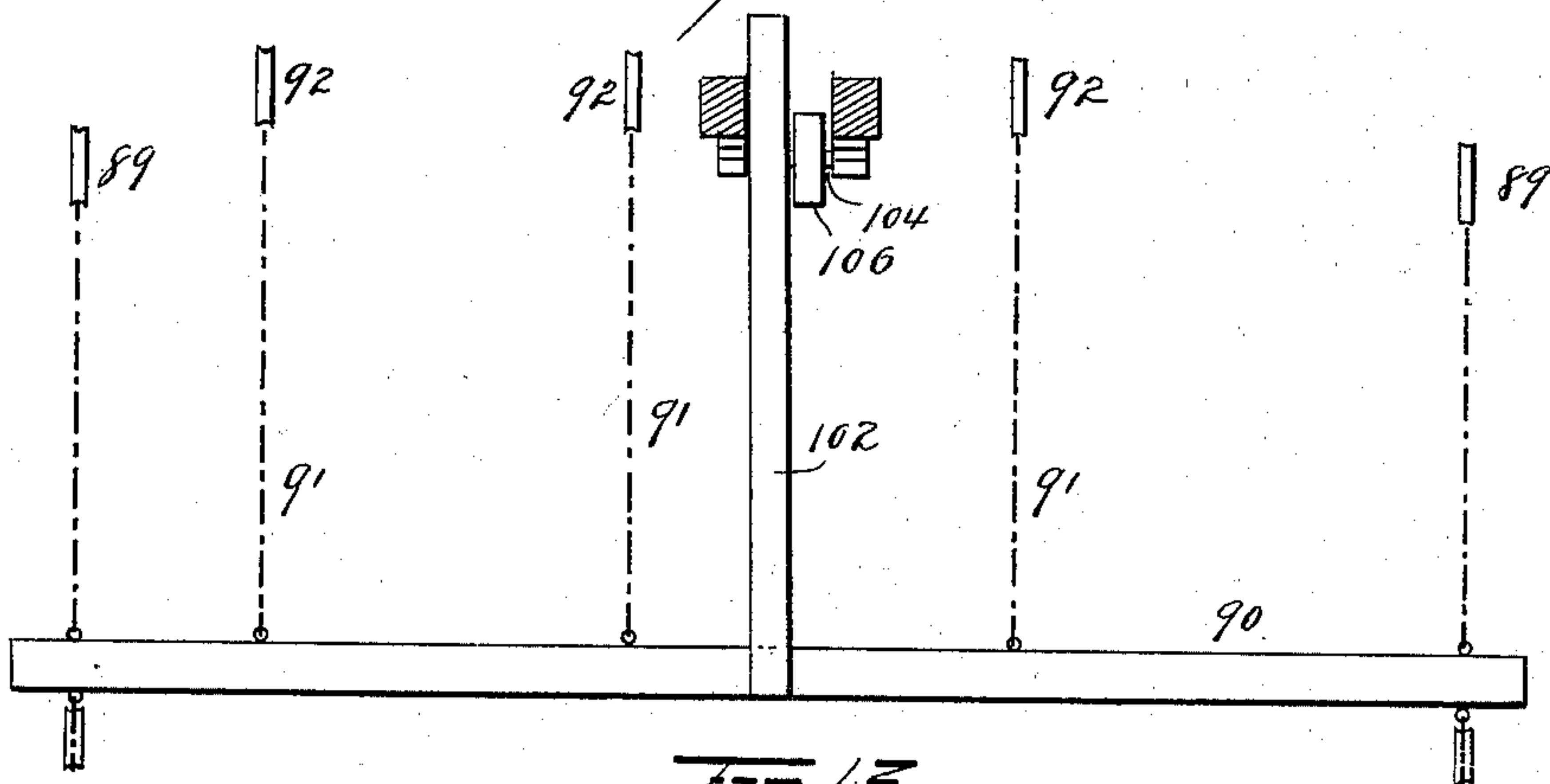


Fig. 13.

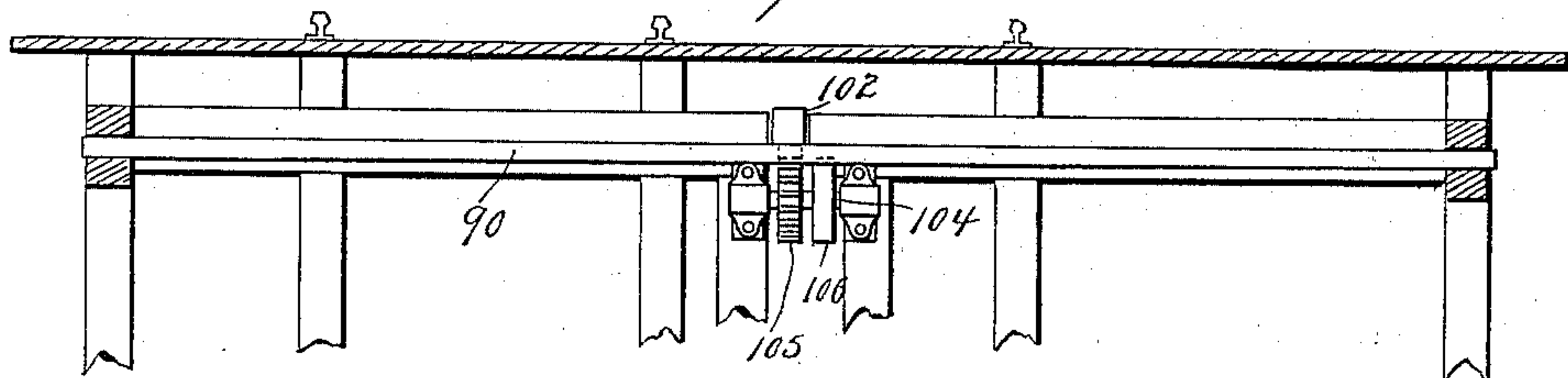


Fig. 14.

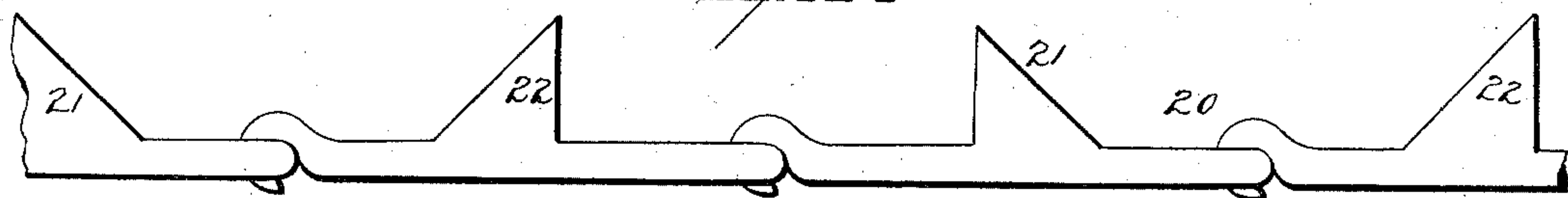


Fig. 15.

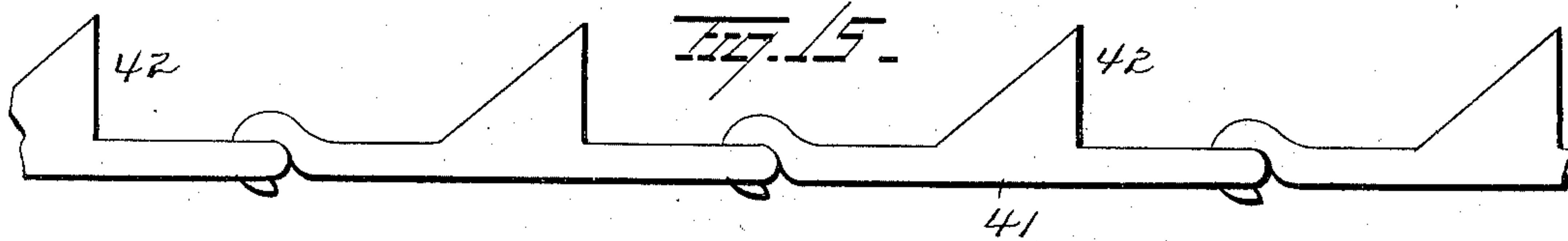
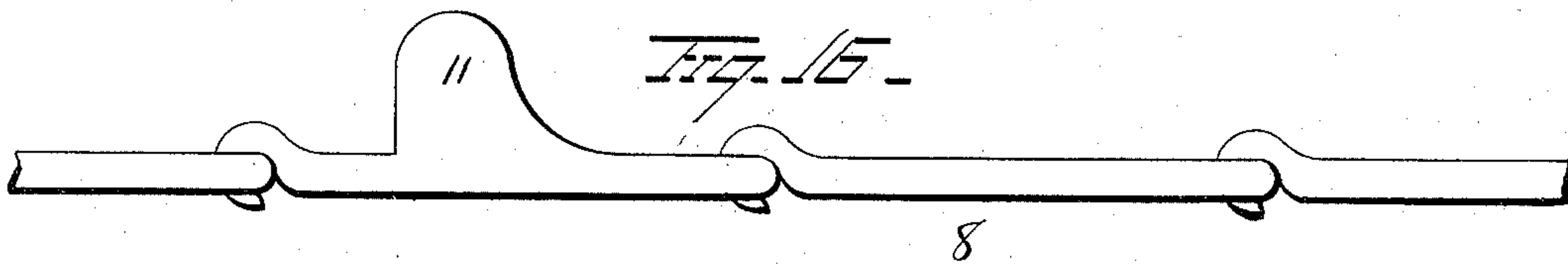


Fig. 16.



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# UNITED STATES PATENT OFFICE.

WILLIE GRAHAM, OF MERIDIAN, MISSISSIPPI.

## LUMBER-STACKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 604,169, dated May 17, 1898.

Application filed October 30, 1897. Serial No. 656,913. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIE GRAHAM, a resident of Meridian, in the county of Lauderdale and State of Mississippi, have invented certain new and useful Improvements in Lumber-Stacking Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in lumber-stacking apparatus, one object of the invention being to so construct an apparatus of the class specified that lumber of different widths and thicknesses can be stacked edgewise in the same tier without danger of one piece of lumber overlapping another.

A further object is to provide simple and efficient means for holding and releasing the spacing-sticks.

A further object is to so construct the apparatus that wide timber can be stacked thereby without the necessity of making the parts unduly large.

A further object is to provide the apparatus with simple and efficient devices for effecting the free and easy feeding of the timber edgewise onto the trucks without danger of injury to the lumber or parts of the apparatus from cramping or bending of the lumber in passing onto the trucks.

A further object is to provide simple and sensitive devices whereby to force the pressure-bars toward the lumber and at the same time permit said pressure-bars to yield for boards of different thicknesses.

A further object is to so construct and arrange the pressure-bars and devices connected therewith that said bars will tend not only to press outwardly against the lumber as it is stacked on the trucks, but at the same time, so that said pressure will tend to exert a downward pressure, and thus assist in retaining the trucks down upon the tracks.

A further object is to provide simple and efficient means whereby to control the feeding of the trucks for successive tiers of lumber and to hold said trucks accurately in position while a tier of lumber is being fed onto said trucks.

A further object is to so construct and arrange presser-bars that they will serve to keep

the delivery-chains in proper relation to the lumber on the trucks, but permitting said chains to yield sufficiently to accommodate lumber of different thicknesses.

A further object is to so construct and arrange the apparatus that the lumber will be under its control at all times until it is deposited on the trucks.

A further object is to construct the apparatus in such manner that a single board or more boards or a complete tier can be deposited at a time on the trucks without danger of the boards overlapping.

A further object is to produce a lumber-stacking device which shall be comparatively simple in construction, which shall be accurate in operation, which can be readily manipulated and controlled, and which shall be effectual in all respects in the performance of its functions.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation. Fig. 2 is a front view. Fig. 3 is a plan view. Figs. 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, and 19 are views illustrating various details.

A represents the framework of the apparatus, having an inclined portion A' at its upper right-hand corner, as shown in Fig. 1. At or near the lower end of inclined portion A' of the frame a shaft 1 is mounted in suitable bearings and carries a series of sprocket-wheels 2. At the upper end of the inclined portion A' of the frame another shaft 3 is mounted in suitable bearings, and on this shaft two sets of sprocket-wheels 4 5 are loosely mounted, preferably on roller-bearings. A shaft 6 is mounted in the upper portion of the framework at a point beyond and somewhat below the shaft 3, and to said shaft 6 a series of sprocket-wheels 7 is fixed. A series of sprocket or ramping chains 8 pass over the sprocket-wheels 2, 4, and 7 and over a frame 9, disposed in close proximity to the wheels 4 5, so that lumber carried up by the chains 8 will be deposited on the upper platform 10 of the apparatus at a point beyond said wheels 4 5. The frame 9 consists of a



series of parallel strips placed side by side, as shown in Fig. 1. In view of the fact that the chains 8 are depended upon to elevate the lumber said chains are provided at intervals with lugs 11, against which the edges of the boards will abut and by which the boards will be prevented from slipping.

Where the structure will admit of the ramping chains being disposed in a horizontal position, the lugs 11 may be omitted from said chains.

It will be observed that the shaft 3 is mounted at one end of the upper platform 10 of the structure. At the other end of the said platform a series of curved castings 12 are located and form one side of a throat 13, said castings being made to extend downwardly with an easy outward curvature and to terminate just above a series of sprocket-wheels 14, carried by a transverse shaft 15, mounted in brackets 16, secured to the upper part of the structure at the front end thereof. An idle pulley 17 is mounted in a bracket or pulley-block 18, connected with a timber 19, secured to the inclined rear portion of the structure. A series of sprocket-chains 20 passes over the sprocket-wheels 5 and 14 and the pulley 17 and through grooves or recesses in the curved throat-castings 12. The chains 20 are each provided with two series of lugs 21 22, which are oppositely disposed, the lugs 21 of each chain being adapted to propel the lumber on its way to the stacking appliances and alternating with the lugs 22, and the latter adapted to resist the movement of the lumber after it begins to descend through the throat 13. By this arrangement of lugs on the chains 20 I am enabled to stack boards of varying widths and thicknesses without danger of overlapping. The chains 20 are so arranged that when they are passing over the upper platform 10 the lugs 21 22 will not project above the upper surface thereof, and consequently said lugs will not engage the lumber disposed on said platform.

Large lugs 23 are secured to the chains 20 and adapted, when the chains are passing over the platform, to project above the upper face of the platform 10. The large lugs 23 are so spaced apart on the chains 20 that when a predetermined quantity of lumber shall have accumulated on the platform 10 one of the lugs will engage said lumber and force it forwardly to the curved castings 12 of the throat 13, when the lumber will be carried over said castings and lowered toward the trucks by means of the lugs 21 22 on the chains 20, as above explained. In the drawings I have shown the chain 20 provided with two lugs 23, each suitably spaced apart to permit the collection of sufficient lumber on the platform 10 for one complete tier.

A series of brackets 24 is secured on the upper timbers of the structure near the front end thereof and each provided with parallel upturned lugs for the reception of rods or bars 25, adapted to pass loosely through a

transverse timber 26, which constitutes a portion of one side of the throat 13. The throat-timber is provided with face-plates 27, having flanges 28 where the rods or bars 25 pass through it, so as to insure the free yielding movements of said throat-timber.

In order to normally retain the throat-timber 26 at the inner ends of the brackets 24, and thus in proper relation to the sprocket-wheels on the shaft 15 and the throat-castings 12, cords 26<sup>a</sup> are attached to the respective ends of said throat-timber, and after passing over suitable pulleys 26<sup>b</sup> depend to points in proximity to the base of the framework, where they are provided with weights 26<sup>c</sup>.

On top of the throat-timber 26 a series of beveled or curved brackets 29 are secured, said brackets and the timber 26 forming one side of the throat 13, while the other side of said throat is formed by the castings 12, as before explained. The brackets 29 serve to guide the lumber into the throat 13.

A series of two or more ropes or straps 30 is attached at one end to the throat-timber 26 and extend up over the throat portion of the apparatus and then over, parallel with, and beyond the platform 10 and the sprocket-wheels 4 5. At the rear ends the ropes or straps 30 may be attached to cords 31, which after passing over pulleys 32 depend to points in proximity to the base of the structure, where they are provided with weights 33.

The lumber, which is elevated and deposited by the ramping chains onto the platform 10, will be disposed under the straps or ropes 30 and will be retained by them flat upon the platform, and thus the boards will be prevented from buckling, overlapping, or moving backwardly. The straps or ropes also serve to properly guide the lumber over the castings 12 and into the throat 13, and the weights attached to said straps serve to exert sufficient pull upon them to keep the throat-timber 26 well up to its work against the boards passing through the throat, but at the same time permitting said throat-timber to yield to permit the passage of a thick board through the throat.

The structure or framework of the apparatus is made some distance above the base with a lower platform composed of timber 34, on which tracks 35 are located for the accommodation of trucks 36, on which the lumber is to be stacked, said trucks being provided with sockets for standards 37<sup>b</sup>, against which the first tier of lumber will bear, and in order to prevent the standards from falling sideways when they are first placed in position stops 37<sup>a</sup> are secured to the throat-timber 26. Just under the transverse shaft 15 a series of fixed uprights 37 are located and extend down to the timbers of the lower platform. To two (or more) of the uprights 37 L-shaped levers 38 39 are pivotally connected, the short downwardly-projecting arms of said levers being pivotally connected to and adapted to support presser-bars 40, each having a groove in



its front face for the accommodation of lowering-chains 41, having lugs 42, said chains being made to pass over sprocket-wheels 43 on the shaft 15 and over pulleys 44, mounted in sliding brackets 45, attached to the lower ends of said presser-bars. The lugs 42 on the chains 41 will preferably be so disposed as to receive the boards and lower them to their proper positions on the tiers on the trucks, the lower faces of said lugs being beveled, so that when they engage the upper board of a tier the chains and presser-bars will be forced back, so as to permit the lugs to pass the lumber already piled on the trucks without marring the said lumber. The long arm of each L-shaped lever 38 39 projects rearwardly, and to the free end of the long arm of lever 38 a depending cord 46 is attached, and to the lower end of said cord a weight 47 is attached. A cord 48 is similarly attached to the long arm of lever 39 and provided at its lower end with a weight 49. It is apparent that the action of the weights 47 and 49 is to tend to turn the L-shaped levers on their fulcrums, and thus tend to force the presser-bars 40 toward the last tier of lumber on the trucks, and the lowering-chains passing through grooves in said presser-bars will be kept well up to their work, but at the same time be permitted to yield sufficiently to permit the passage of thick lumber and to allow the lugs on said chains to pass the piled lumber on the trucks, as above explained. A shaft 50 is mounted in the uprights 37 near their upper ends, and to said shaft a number of crank-arms 51, corresponding to the number of uprights, are secured. L-shaped levers 52 52 are pivotally supported by the uprights 37, and the upwardly-projecting arms of these levers are pivotally attached to and support auxiliary presser-bars 53. The long arms of each pair of levers 52 are connected together by means of a rod 54 and are connected with the respective crank-arms 51. A lever 55 is pivotally supported at a point between its ends by each upright 37, the point of attachment of said levers 55 to the uprights preferably being at points some distance below the upper ends of the presser-bars. The long arm of each lever 55 is provided with a weight 56, while the short arm of each of said levers is connected with one of the crank-arms 51 on shaft 50 by means of a rod or pitman 57. From this construction and arrangement of parts it will be seen that the cooperation of the weighted levers 55 with the L-shaped levers 52 will result in forcing the auxiliary presser-bars outwardly to keep the piled lumber in proper position in tiers, and it will further be seen that said auxiliary presser-bars will also tend to move downwardly as well as forwardly on account of the manner in which they are supported—viz., on the short arms of the L-shaped levers 52—and thus tend to press the tier of lumber downwardly and serve in this manner to hold the trucks down upon the tracks. In order to

permit the presser-bars to move freely, and thus be sustained, the pivot-pins of the L-shaped levers 38, 39, and 52 are mounted in face-plates 27, having flanges 28, the same as above explained in connection with the throat-timber 26.

Several plates 58 are secured to the throat-timber 26, and each of said plates is provided with guides 59 for the reception of a plate 60, offset at its lower portion and provided with recesses or notches 61 to permit the passage of the guides 59. The plates 60 serve as stops for the upper ends of the spacing-sticks, which separate the tiers of lumber, it being understood that the tiers of lumber are spaced apart for the purpose of forming passages for the circulation of air when the loaded trucks are run into a drying apparatus. The plates 60 also serve as stops for the uprights on the trucks when the latter are first placed in position to receive the lumber.

Brackets or castings 62 are secured to the throat-timber 26, and each is provided with a journal-bearing 63 for the reception of a shaft 64, to which a series of arms 65 is secured. Each arm 65 is connected by means of a chain or wire 66 with the stop-plates 60, so that when said shaft is turned (by means of a suitable lever 67) the stop-plates will be raised and moved out of the path of the standards on the trucks, and thus permit the loaded trucks to be run out of the apparatus. The truck-standards above referred to are the ones which are placed in positions in sockets 68 on the ends of the trucks next to the last tier of lumber stacked thereon. Heretofore it has been necessary to make said standards several inches shorter than those at the other ends of the trucks, which is not desirable, whereas by providing means for raising the stop-plates 60 out of the path of the standards I am enabled to use full-length standards at both ends of the trucks, and thus the upper boards of the last tier will be effectually prevented from displacement.

The holders 70 for the lower ends of the spacing-sticks are attached to the auxiliary presser-bars 53. Each lower stick-holder comprises an L-shaped arm 71, provided at the outer end of its member *a* with an arm or extension 72, projecting therefrom at right angles and adapted to bear against a spacing-stick. The L-shaped arms 71 are pivotally supported at 73 to the lower portion of the respective auxiliary presser-bars 53, and the arm or extension 72 of the member *a* of each arm 71 is maintained pressed against a spacing-stick by means of a weight 74, attached to the member *b* of said L-shaped arm or lever. Each L-shaped arm is provided with a long lever 75, by means of which to operate it, and said levers when the stick-holders are not in use will be held up by means of pins 76 on the presser-bars 53. By mounting the lower stick-holders on the presser-bars 53 the latter will assist the weights 74 in pressing said sticks against the last tier of lumber piled



without detracting from the yielding action of said presser-bars to permit the passage of thick boards.

Two or more rods or bars 77 are pivotally  
5 attached at their inner ends to the frame-  
work under the respective ends of the shaft  
15, and said rods or bars are supported at  
their free outer ends by the timber at the top  
of the extreme front end of the structure.  
10 The rods or bars 77 serve to support and  
guide a transverse timber 78, the latter having  
guide-bars 79 secured to its respective ends,  
and said guide-bars being made at their free  
15 ends with hook-shaped portions 80 to receive  
the rods or bars 77, on which the transverse  
timber is supported as above explained and  
on which it is adapted to move. The pur-  
pose of the transverse timber 78 is to bear  
20 against the standards on the truck and main-  
tain them accurately in upright position while  
the trucks are being loaded with tiers of lum-  
ber. It is of course necessary that the trans-  
verse timber 78 shall be raised to permit the  
25 upper ends of the truck-standards to pass it  
when the trucks are first run into position to  
receive the lumber and also to permit the  
passage of the upper ends of said standards  
when the loaded trucks are run out of the  
30 apparatus. To provide means whereby the  
transverse timber 78 can be raised for the  
purposes above stated, a shaft 81 is mounted  
in suitable bearings on top the front end of  
the structure and provided on its ends with  
35 crank-arms 82, connected with the free ends  
of the rods or bars 77 by cords or chains 83.  
An arm 84 projects upwardly from the shaft  
81 and is connected with an operating-lever  
85 by means of a cord or other flexible de-  
vice 86. It is apparent that by operating the  
40 lever 85 the transverse timber 78 can be  
readily raised out of the path of the stand-  
ards on the truck.

To the respective ends of the transverse tim-  
ber 78 ropes 87 are attached and pass rear-  
45 wardly over pulleys 88, then downwardly un-  
der pulleys 89, and then rearwardly and are  
attached at their rear extremities to another  
movable transverse timber 90, mounted in  
the lower portion of the framework, prefer-  
50 ably in rear of the center thereof. The lower  
transverse timber 90 also has attached thereto  
a series of ropes 91, which extend forwardly  
therefrom and under pulleys 92, then up-  
wardly over pulleys 93, and then forwardly  
55 to a series of knees 94, to which they are at-  
tached. The knees 94 are mounted to slide  
on guide-rods 95, (preferably composed of  
piping,) mounted in suitable brackets 96, dis-  
posed to one side of the tracks on which the  
60 trucks run. Each knee comprises a sleeve  
97, adapted to slide on the guide-rods 95, and  
two lugs 98 and 99, projecting from said sleeve  
at different angles. The lug 98 is beveled, as  
at c, and is adapted to engage the end of the  
65 truck when the sleeve is turned and thus  
connect the knee thereto. The lug 99 serves  
as a pedal by means of which to turn the

sleeve 97 and thus release the knee from the  
truck when the latter shall have been loaded  
and ready to be run out of the apparatus. In  
70 order to press the transverse bar 78 up against  
the truck-standards and also to press the  
knees against the trucks, weights 100 are con-  
nected by means of ropes 101 to the lower  
transverse movable timber 90.

The lower transverse movable timber 90 is  
provided at a point centrally between its ends  
with a tongue 102, to which a rack-bar 103 is  
secured.

A shaft 104 is mounted under the forward  
80 end of the rack-bar, (when the parts are in  
their normal or starting positions, as shown  
in Fig. 1,) and to this shaft a pinion 105 is  
secured and adapted to mesh with the rack-  
bar. A brake-wheel 106 is also secured to  
85 the shaft 104 and adapted to be grasped by  
a brake-band 107, under the control of an  
operating-lever 108. During the operation  
of the apparatus the knees 94, and conse-  
quently the trucks, are forced back as the  
90 tiers of lumber are deposited on the trucks  
against the resistance of the weights 100. By  
means of the band-brake (which is, as above  
explained, connected with the lower trans-  
verse timber 90) the operator will be enabled to  
95 place the proper tension upon the transverse  
timbers 78 and 90 to accommodate any thick-  
ness of lumber that is being stacked, it re-  
quiring, for instance, more tension when  
stacking two, three, or four inch lumber than  
100 it does when stacking one-inch stock. The  
band-brake further resists the weights 100,  
which are used to cause the movable trans-  
verse timber 78 and the knees 94, connected  
with transverse timber 90, to move toward  
105 the truck-standards and trucks, respectively,  
when the friction-brake is released.

In order to provide means for driving the  
various chains hereinbefore described where-  
110 by the lumber is carried over the structure  
and deposited on the trucks, the shafts 6 and  
15 are extended beyond their bearings in the  
framework, and with these shafts the driving  
means is connected. The main driving-pul-  
ley 109 is loosely mounted on the shaft 15, so  
115 as to receive a belt from any convenient driv-  
ing means, such as a steam-engine, and said  
pulley is adapted to be locked to the shaft by  
means of a friction-clutch 110. A sprocket-  
wheel 111 is also mounted loosely on the shaft  
120 15 and adapted to be locked to the driving-  
pulley 109 by means of a positive clutch 112.  
Another sprocket-wheel 113 is secured to the  
shaft 6, and over said sprocket-wheels a  
sprocket-chain 114 passes. When the oper-  
125 ation of the apparatus is first started, the  
sprocket-wheel 111 will be locked to the driv-  
ing-pulley by means of the clutch 112, so as  
to drive the shaft 6, and consequently the  
ramping-chains, by means of which the lum-  
130 ber is deposited on the upper platform of the  
structure, as hereinbefore explained. When  
the proper amount of lumber shall have been  
accumulated on the upper platform to make



a tier or a part of a tier, the ramping chains will preferably be stopped by means of the clutch 112. The clutch 110 will be operated to lock the driving-pulley 109 to the shaft 15, and thus cause motion to be imparted to said shaft. Motion will thus be imparted to the chains 20 and 41, so as to cause the lumber to be carried over the upper platform and through the throat 13 and disposed in a tier onto the trucks, as hereinbefore explained.

Other means than those above described may be employed and numerous slight changes might be made in the various parts of the apparatus without departing from the spirit of my invention or limiting its scope, and hence I do not wish to limit myself to the precise details herein set forth.

It is sometimes desirable to provide means whereby to prevent the lumber from entering the throat until the proper time arrives. Such means are more particularly desirable when the ramping chains are arranged horizontally, as when thus arranged they are liable to crowd the lumber forwardly over the platform and cause one or more boards to fall through the throat before it is desired that they should. For the purpose of preventing the lumber from being moved from the platform into the throat before one of the large lugs 23 on chain 20 engages the lumber I provide a shaft 115, mounted in suitable brackets 116 over the forward end of the platform 10 and provided with a series of forwardly and downwardly projecting arms 117, each having a notch 118 at its free end to engage the edge of the first board on the platform 10. The shaft 115 is provided at one end with a horizontally-disposed arm 119, and to the free end of this arm a weight 120 is attached. The weighted arm serves to force the depending arms 117 against the edge of the end board of the timber on the platform with sufficient pressure to prevent the timber from entering the throat until it is positively moved forward by the lugs 23 on the chains 20.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a lumber-stacking machine, the combination with suitable framework having a platform, of ramping chains constructed and adapted to deposit lumber on said platform, means for supporting trucks in said framework, and chains constructed and adapted to move the lumber from said platform, and vertically-disposed chains having lugs thereon and adapted to deposit the lumber edgewise in tiers on said trucks, substantially as set forth.

2. In a lumber-stacking apparatus, the combination with suitable framework having a platform, of a series of chains passing over said platform and adapted to convey lumber from one end to the other thereof, a series of ramping chains constructed and adapted to deposit lumber onto the platform over said

first-mentioned chains, and vertically-disposed lowering-chains arranged to receive lumber from the first-mentioned chains and deposit it in tiers onto a truck, substantially as set forth.

3. In a lumber-stacking apparatus, the combination with suitable framework having a platform, of wheels mounted at one end of said platform, sprocket-chains having lugs thereon passing over said wheels and over the platform, a frame in the platform adjacent to said wheels, and ramping chains extending over said frame and adapted to deposit lumber on the platform over said first-mentioned chains and forwardly of said wheels, substantially as set forth.

4. In a lumber-stacking apparatus, the combination with suitable framework having a platform, of a throat below the forward end of said platform, chains passing over said platform and into said throat, and two series of lugs on each of said chains and having faces at right angles to the chains, the lugs of one series alternating with the lugs of the other series, and the said angular faces of the lugs of one series being oppositely disposed to the angular faces of the other series, whereby one series of lugs will propel lumber forwardly and the other series resist the forward movement of the lumber, substantially as set forth.

5. In a lumber-stacking machine, the combination with suitable framework having a platform, of a series of sprocket-wheels at one end of said platform, a series of conveying-chains passing over said sprocket-wheels and over the platform, a frame under said chains in proximity to said sprocket-wheels and a series of ramping chains passing over said sprocket-wheels and said frame, and other sprocket-wheels below said frame, over which said ramping chains pass, substantially as set forth.

6. In a lumber-stacking apparatus, the combination with framework having a platform and means near the forward end of said platform for depositing lumber onto trucks, of a series of wheels at the rear end of the framework, a shaft at the rear end of the platform, wheels mounted loosely on said shaft, ramping chains passing over said wheels for depositing lumber onto said platform, a driving-shaft disposed below and forwardly of said first-mentioned shaft, a series of sprocket-wheels secured to the driving-shaft and over which said ramping chains pass, a second series of wheels mounted loosely on said first-mentioned shaft, chains passing over the platform and the last-mentioned wheels and means for driving said last-mentioned chains, substantially as set forth.

7. In a lumber-stacking apparatus, the combination with a framework having a platform, and means for depositing lumber onto said platform, of a series of chains passing over the platform below the upper surface thereof, two series of lugs having oppositely-



disposed angular faces, on said chain, said lugs being of a length to terminate below the surface of the platform, and large lugs also secured to said chains at intervals and adapted to engage lumber on the platform and move it forwardly to be conducted by said first-mentioned lugs toward stacking devices, substantially as set forth.

8. In a lumber-stacking apparatus, the combination with framework having a platform, of curved bracket-castings depending from the forward end of said platform, sprocket-wheels mounted at the lower ends of said castings, sprocket-wheels at the other end of the platform, idle-pulleys disposed below the last-mentioned sprocket-wheels and a series of conveying-chains passing over said sprocket-wheels, idle-pulleys and curved castings, substantially as and for the purpose set forth.

9. In a lumber-stacking apparatus, the combination with framework having a platform and means for supporting trucks, of a series of curved brackets or castings at the forward end of said platform, said brackets or castings having grooves, a series of chains passing over the platform and through the grooves of said brackets or casting, two series of lugs on each chain, the lugs of one series alternating with the lugs of the other series and the respective series of lugs having oppositely-opposed angular faces, and means intermediate of said chains and trucks for depositing lumber from said chains onto the trucks, substantially as set forth.

10. In a lumber-stacking apparatus, the combination with framework, adapted to receive trucks, of a throat located above the position occupied by said trucks, said throat having one wall rigid and the other wall yielding, substantially as set forth.

11. In a lumber-stacking apparatus, the combination with framework adapted to receive trucks, of a throat located over the position occupied by the trucks, a movable timber forming one wall of said throat, and means attached to said timber and tending to cause it to press toward the other wall of the throat, substantially as set forth.

12. In a lumber-stacking apparatus, the combination with a framework adapted to receive trucks, of curved brackets or castings located above the position occupied by the trucks and forming one side of a throat, a movable timber forming the other side of said throat, and weights attached to said movable timber and tending to force it toward said brackets or castings, substantially as set forth.

13. In a lumber-stacking apparatus, the combination with a framework adapted to receive trucks, of a series of curved brackets or castings located above the position occupied by the trucks and forming one side of a throat, a movable timber forming the other side of said throat, ropes attached to said movable timber and passing over pulley mounted in the framework in rear of said brackets or

castings and weights secured to the free ends of said ropes, substantially as set forth.

14. In a lumber-stacking apparatus, the combination with framework adapted to receive trucks and having a platform, of a series of curved brackets or castings forming one side of a throat located above the position occupied by the trucks, a movable timber forming the other side of said throat, means for conveying lumber from said platform, through the throat and onto the trucks, a series of straps or ropes secured at one end to said movable timber passing over the platform and provided at their free depending ends with weights, substantially as set forth.

15. The combination with framework adapted to receive trucks, of a throat above the position occupied by the trucks, a movable timber forming one side of said throat and adapted to be yieldingly pressed toward the other side thereof, of guiding-brackets secured to the top of said movable timber and adapted to assist in guiding lumber through said throat, substantially as set forth.

16. The combination with a framework adapted to receive trucks and having a platform at its top, of an automatically-expandible throat above the position occupied by the trucks, means for conducting lumber from the platform through the throat and means for conducting lumber from the throat and depositing it upon the trucks, substantially as set forth.

17. The combination with a framework adapted to receive trucks and having a platform at its top, of a series of curved brackets or castings at one end of said platform and forming one side of a throat, a yielding timber forming the other side of said throat, beveled brackets secured to said timber and cooperating with said curved bracket or castings to direct lumber to the throat, means for conducting the lumber from the throat to the trucks, substantially as set forth.

18. The combination with a framework adapted to receive trucks, of a series of brackets or castings forming one side of a throat located above the position occupied by the trucks a movable timber forming the other side of the throat, brackets secured to the framework and having rods passing through said movable timber whereby, to support the latter, face-plates secured to said timber and having flanges surrounding said rods, substantially as set forth.

19. In a lumber-stacking apparatus, the combination with a framework, of a series of lowering-chains, a series of fixed uprights parallel with said chains, presser-bars supported by said uprights and means for pressing said presser-bars outwardly, whereby to keep the lowering-chains well up to the lumber being stacked on the trucks, substantially as set forth.

20. In a lumber-stacking apparatus, the combination with framework, of a series of lowering-chains, a series of yielding bars to



press said chains outwardly, sprocket-wheels mounted in the framework over the presser-bars, for said chains, and pulleys carried by the lower ends of the presser-bars, over which  
5 said chains also pass, substantially as set forth.

21. In a lumber-stacking machine, the combination with framework, a series of sprocket-wheels, a series of yielding presser-bars, pulleys movably supported by the lower ends of  
10 said presser-bars and lowering-chains passing over said sprocket-wheels and pulleys, substantially as set forth.

22. In a lumber-stacking apparatus, the combination with a framework having a platform at its top, of a throat at one end of said platform, a shaft mounted in proximity to  
15 said throat, a series of sprocket-wheels on said shaft, conveying-chains passing over the platform, through said throat and over said sprocket-wheels, a second series of sprocket-wheels on said shaft, lowering-chains passing  
20 over said last-mentioned sprocket-wheels, and presser-bars adapted to bear against said lowering-chains, substantially as set forth.

23. In a lumber-stacking apparatus, the combination with a series of lowering-chains and a series of fixed uprights disposed parallel therewith, of crank-arms mounted in  
30 said uprights, bars pivotally connected with said crank-arms and adapted to press the lowering-chains outwardly, substantially as set forth.

24. In a lumber-stacking apparatus, the combination with a series of lowering-chains, a series of fixed uprights bell-crank levers pivotally connected to said fixed uprights, presser-bars for said lowering-chains, pivotally  
35 attached to one arm of the respective bell-crank levers, and weighted cords attached to the other arms of said bell-crank levers, substantially as set forth.

25. In a lumber-stacking apparatus, the combination with trucks and means for stacking  
45 ing lumber edgewise thereon, of a series of presser-bars constructed to bear against the lumber outwardly and downwardly, substantially as and for the purpose described.

26. In a lumber-stacking apparatus, the combination with trucks and means for stacking  
50 ing lumber edgewise thereon, of a series of fixed uprights, bell-crank levers pivotally connected to said uprights, one arm of each bell-crank lever being adapted to project upwardly, presser-bars connected with said  
55 upwardly-projecting arms of the bell-crank levers and adapted to bear against the lumber, and a weight connected with the other arms of said bell-crank levers, substantially as set forth.

27. In a lumber-stacking apparatus, the combination with trucks and means for stacking  
65 ing lumber edgewise thereon, of fixed uprights, bell-crank levers pivotally connected to said uprights and each having one arm projecting upwardly, presser-bars pivotally connected to said upwardly-projecting arms of

the bell-crank levers, a rod or bar connecting the other arms of said bell-crank levers, a crank-shaft connected with said rod or bar, a weighted lever, and a connection between  
70 said weighted lever and said crank-shaft, substantially as set forth.

28. In a lumber-stacking apparatus, the combination with means for stacking lumber  
75 edgewise, of a series of yielding presser-bars adapted to bear against the lumber being stacked, and holders for spacing-sticks carried by said presser-bars, substantially as set forth.

29. In a lumber-stacking apparatus, the combination with means for stacking lumber  
80 edgewise, of a spacing-stick holder consisting of a pivoted angular lever having one arm adapted to press against the spacing-sticks and a weight on the other arm of said angular lever, substantially as set forth.

30. In a lumber-stacking apparatus, the combination with means for stacking lumber  
85 edgewise, of a spacing-stick holder consisting of an angular lever having one arm adapted to press against the lumber being stacked, a weight on the other arm of said angular lever, and an operating-lever secured to said angular lever, substantially as set forth.

31. In a lumber-stacking apparatus, the combination with means for stacking lumber,  
90 edgewise, of yielding presser-bars adapted to bear against the lumber being piled, an angular lever pivotally attached to each of said presser-bars, one arm of said lever being adapted to hold a spacing-stick, and a weight on the other arm of said angular lever, substantially as set forth.

32. In a lumber-stacking apparatus, the combination with means for stacking lumber  
105 edgewise, of yielding presser-bars, angular levers pivotally attached to said presser-bars, one arm of each angular lever being adapted to hold a spacing-stick, a weight on the other arm of said angular lever, an operating-lever secured to each angular lever, and a pin on  
110 each presser-bar adapted to receive said operating-levers and hold the angular levers withdrawn when not in use, substantially as set forth.

33. In a lumber-stacking apparatus, the combination with framework having a throat  
115 for the passage of lumber to be attached on trucks having standards, of guide-plates secured to the timber at one side of said throat, vertically-movable stops for spacing-sticks and the truck-standard, mounted in said guide-plates, and means for raising said stops  
120 out of the path of the upper ends of the truck-standards and spacing-sticks, substantially as set forth.

34. In a lumber-stacking apparatus, the combination with framework having a throat  
125 for the passage of lumber to be stacked on trucks having standards, of a series of guide-plates secured to the timber at one side of said throat, vertically-movable stops for spacing-sticks and the truck-standards, mounted in



said guide-plates, and a crank-shaft mounted on said timber and connected with said stops whereby to raise them out of the path of said spacing-sticks and truck-standards, substantially as set forth.

35. In a lumber-stacking apparatus, the combination with framework, and trucks having standards, of a movable transverse timber and means for causing said transverse timber to bear yieldingly against the upper ends of said truck-standards, substantially as set forth.

36. In a lumber-stacking apparatus, the combination with a framework and trucks having standards, of a movable transverse timber adapted to bear against said truck-standards, cords attached to said transverse timber and passing over pulleys mounted in the framework, and weights connected with said cords, substantially as set forth.

37. In a lumber-stacking apparatus, the combination with framework and trucks having standards, of a transverse movable timber adapted to bear against said truck-standards, guide-rods for said transverse timber, said guide-rods being pivoted at their inner ends to the framework and means connected to the outer ends of said guide-rods whereby to raise them and move said transverse timber out of the path of the upper ends of the truck-standards, substantially as set forth.

38. In a lumber-stacking apparatus, the combination with framework and trucks having standards, of a yielding transverse bar to bear against the truck-standards and means for raising said transverse bar out of the path of said truck-standards, substantially as set forth.

39. In a lumber-stacking apparatus, the combination with framework and trucks having standards, of a yielding transverse timber adapted to bear against said standards, guide-rods for said transverse timber, said guide-rods being pivoted at their inner ends, a crank-shaft mounted above the free ends of said guide-rods, a pivoted operating-lever and a connection between said operating-lever and said crank-shaft, substantially as set forth.

40. In a lumber-stacking apparatus, the combination with framework adapted to receive trucks, of movable knees to engage said trucks, and weights connected with said movable knees, substantially as set forth.

41. In a lumber-stacking apparatus adapted to receive trucks, the combination of guide-rods disposed to one side of the path of movement of said trucks, knees adapted to move on said guide-rods and to be turned to engage the trucks, and weights connected with said knees, substantially as set forth.

42. In a lumber-stacking apparatus, the combination with framework adapted to receive trucks, of guide-rods disposed to one side of the path of movement of said trucks, knees mounted on said guide-rods, each knee comprising a sleeve to slide and to turn on said guide-rods, and two lugs on said sleeve,

one of said lugs being adapted to engage the truck and the other to act as a treadle, and weights connected with said knees, substantially as set forth.

43. In a lumber-stacking apparatus, the combination with framework adapted to receive trucks having standards of a movable transverse timber adapted to bear against the upper ends of the truck-standards, a series of movable knees adapted to engage the trucks, connections between said transverse timber and said knees, means for feeding and stacking lumber onto said trucks and means for regulating the tension on said transverse timber and knees to accommodate the thickness of the lumber being stacked on the trucks, substantially as set forth.

44. In a lumber-stacking apparatus, the combination with framework adapted to receive trucks, of a series of movable knees adapted to engage the trucks, weights connected with said knees means for stacking lumber on said trucks, and brake devices constructed and adapted to regulate the tension on said knees to accommodate the trucks for receiving lumber of different thicknesses, substantially as set forth.

45. In a lumber-stacking apparatus, the combination with framework adapted to receive trucks and means for stacking lumber on said trucks, of movable devices mounted in the framework and adapted to press against the trucks, a friction-brake connected with said movable devices and a lever for controlling said brake, substantially as set forth.

46. In a lumber-stacking apparatus, the combination with framework adapted to receive trucks, and means for stacking lumber on said trucks, of movable devices mounted in the framework and adapted to press against the trucks, a rack-bar connected with said movable devices, a shaft, a pinion on said shaft and meshing with said rack-bar, a brake-wheel also on said shaft, a brake-band on said brake-wheel and a lever for operating said brake-band, substantially as set forth.

47. In a lumber-stacking apparatus, the combination with framework adapted to receive trucks and means for stacking lumber on said trucks, of movable knees adapted to bear against said trucks, a movable transverse bar mounted in the framework, flexible connections between said movable transverse timber and said knees, pulleys located in rear of said movable transverse timber, cords attached to said timber and passing over said pulleys and weights on the depending ends of said cords, substantially as set forth.

48. In a lumber-stacking apparatus, the combination with framework adapted to receive trucks having standards, of an upper movable transverse timber adapted to bear against said standards, movable knees to engage said trucks, a lower movable transverse timber, flexible connections between said movable transverse timbers, and weights connected to said lower movable transverse timber



to pull the same rearwardly, substantially as set forth.

49. In a lumber-stacking apparatus, the combination with framework having a platform, of ramping chains for depositing lumber on the platform, conveying-chains for moving the lumber over the platform and lowering-chains for depositing the lumber, in tiers, of a driving-shaft for the ramping chains, a driving-shaft common to the conveying-chains and the lowering-chains, a pulley mounted and a sprocket-wheel mounted loosely on said last-mentioned shaft, a clutch for securing the pulley to its shaft, a separate clutch for securing said sprocket-wheel to the same shaft, a sprocket-wheel on the driving-shaft of the ramping chains, and a sprocket-chain connecting said sprocket-wheels, substantially as set forth.

50. In a lumber-stacking machine, the combination with a frame having a platform, means for depositing lumber on said platform, means for receiving lumber from said platform and stacking it, and devices for positively moving said lumber from the platform, of yielding devices adapted to bear against the end board of the lumber on the platform

and prevent said lumber from leaving the platform until moved positively by the devices provided for that purpose, substantially as set forth.

51. In a lumber-stacking machine, the combination with a frame having a platform, means for depositing lumber on the platform, means for receiving lumber from the platform and stacking it and means for positively moving said lumber from the platform to the stacking appliances, of a shaft mounted over the platform, a series of arms projecting from said shaft and adapted at their free ends to engage the first board of the timber on the platform, an arm projecting forwardly from said shaft and a weight at the free end of said last-mentioned arm whereby to force the first-mentioned arms against the last board of the lumber on the platform with a yielding pressure, substantially as set forth.

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

WILLIE GRAHAM.

Witnesses:

H. R. DEARBORN,  
J. W. BRAZEAL.