

No. 879,675.

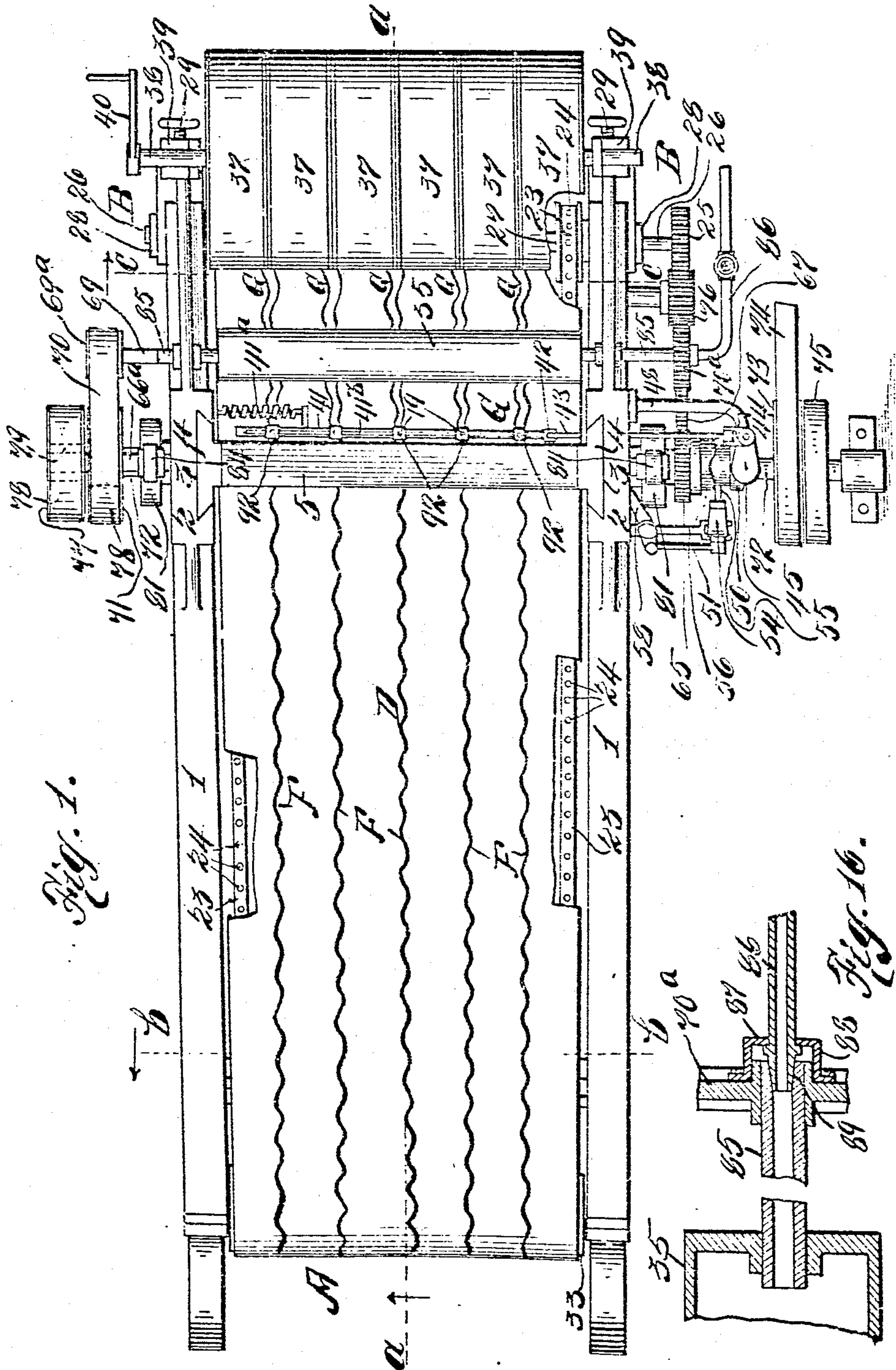
A. ROOS.

PATENTED FEB. 18, 1908.

FABRIC CUTTING MACHINE.

APPLICATION FILED OCT. 30, 1906.

5 SHEETS—SHEET 1.



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5 SHEETS—SHEET 2.

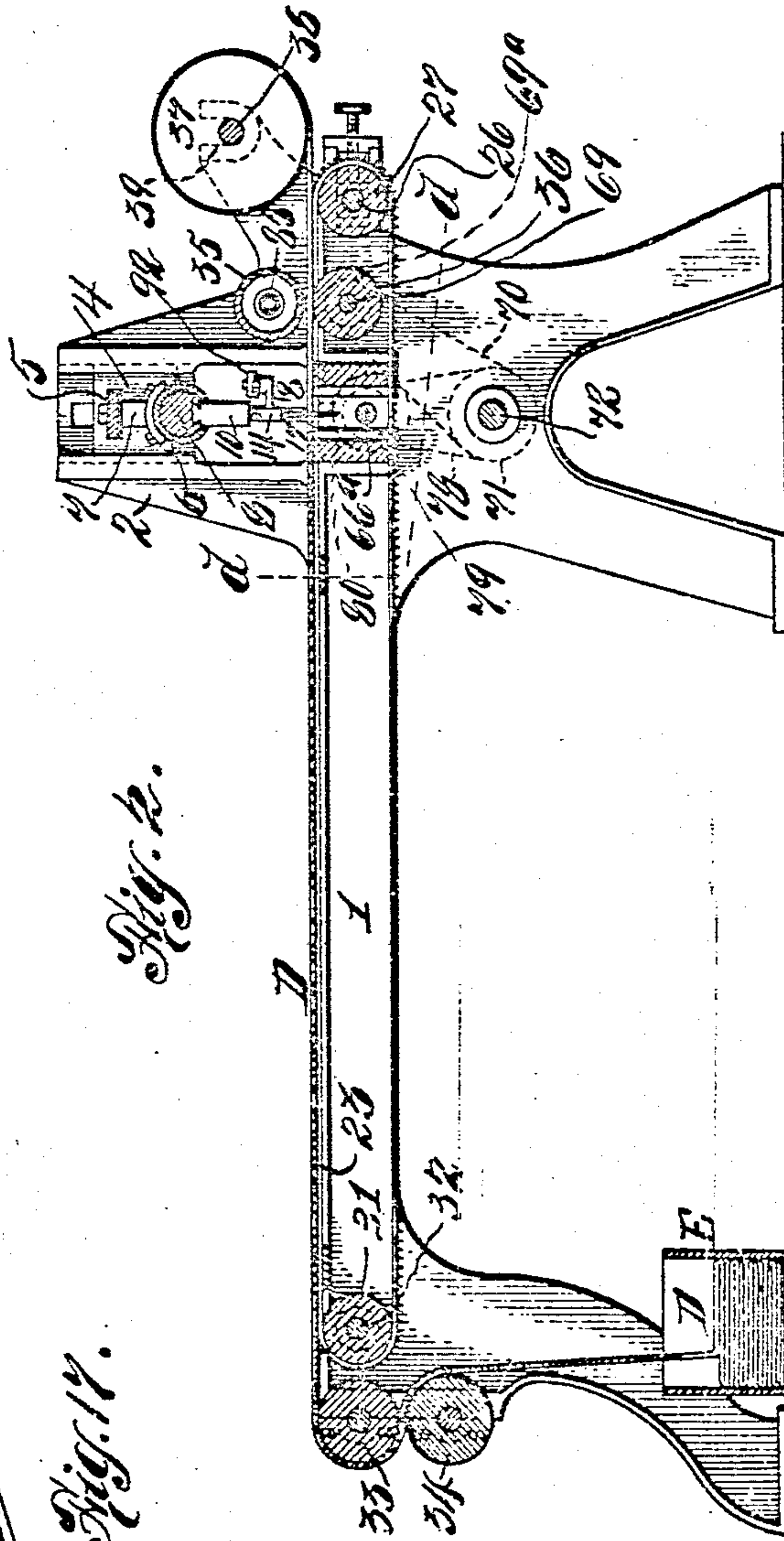


Fig. 12.

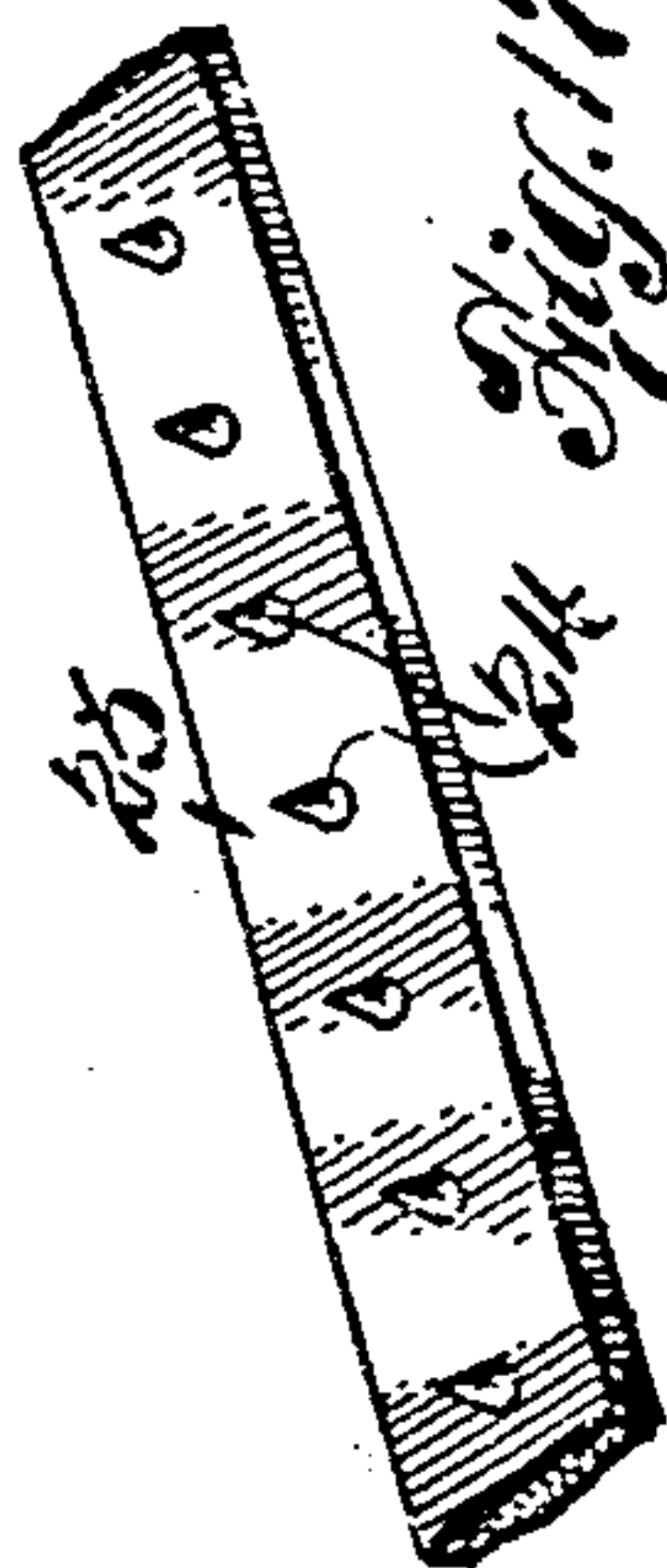


Fig. 13.



Fig. 14.

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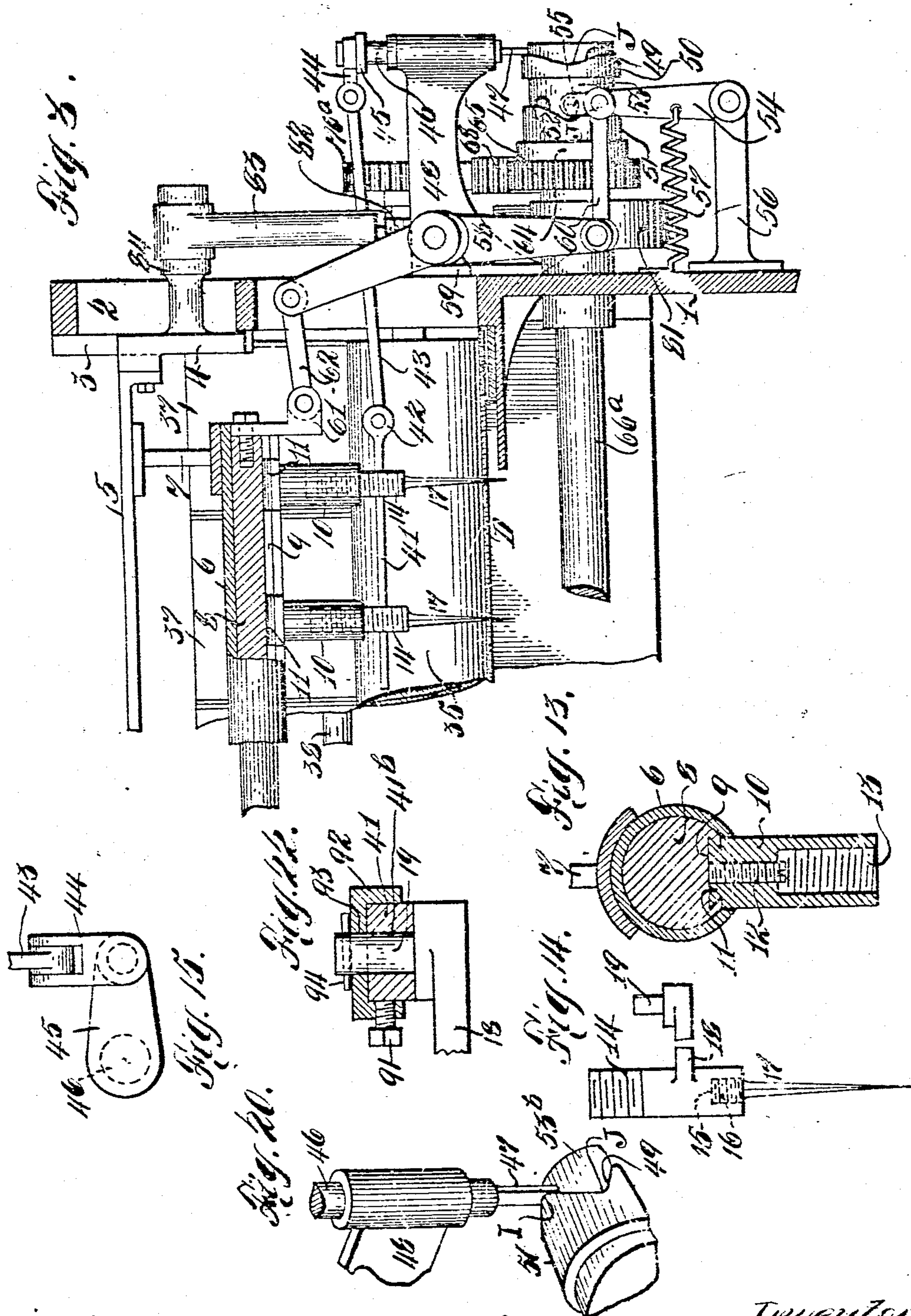
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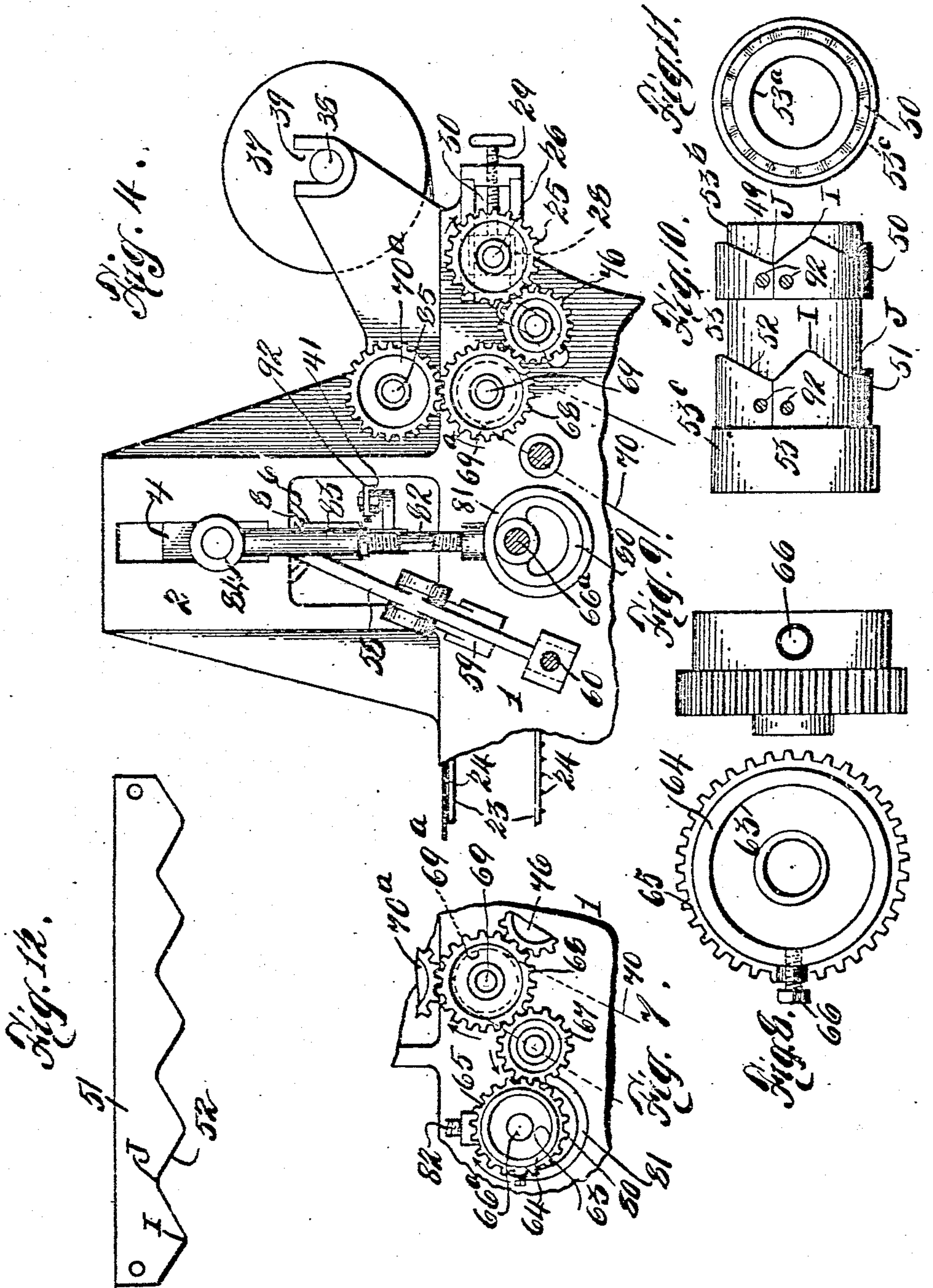
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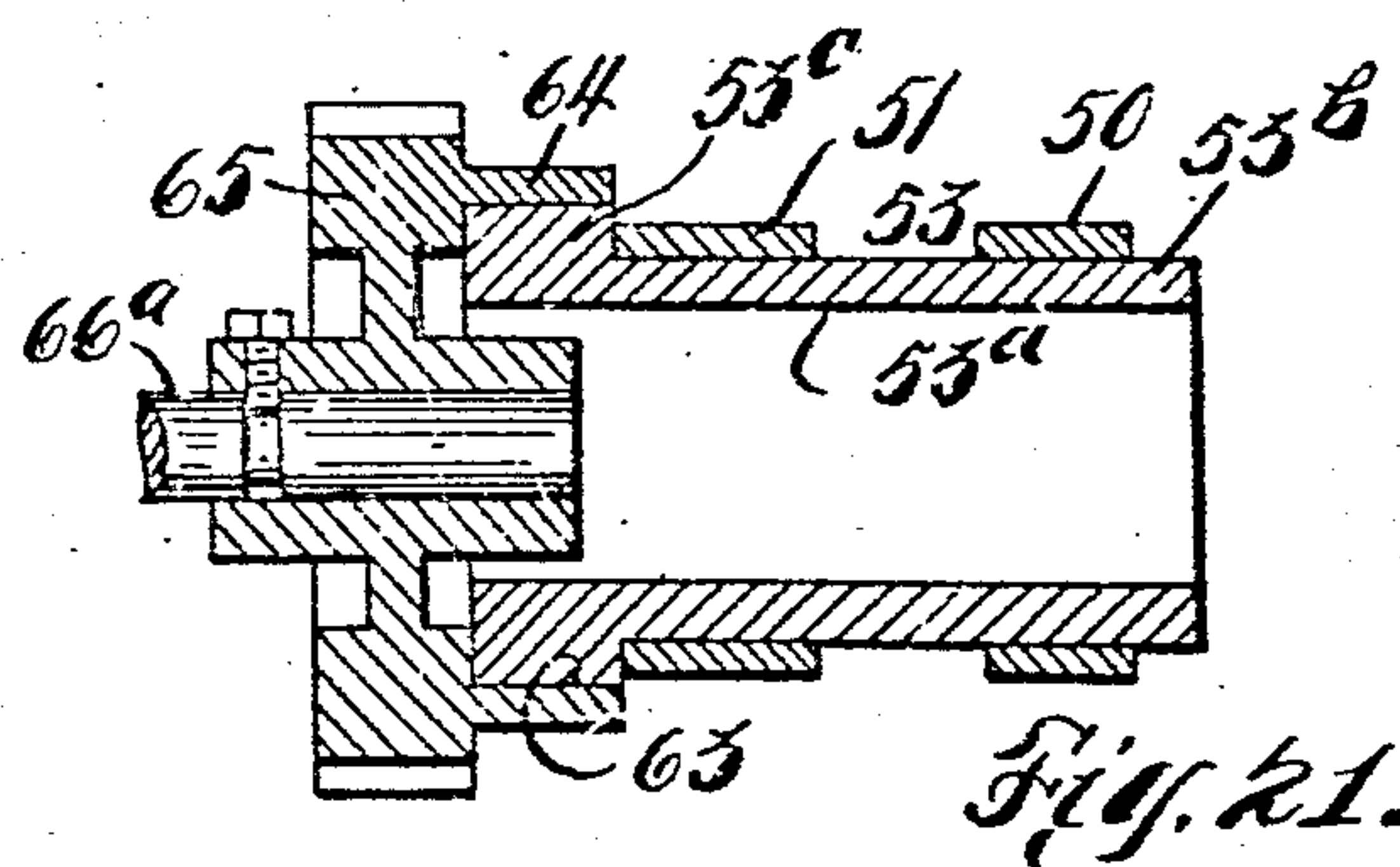
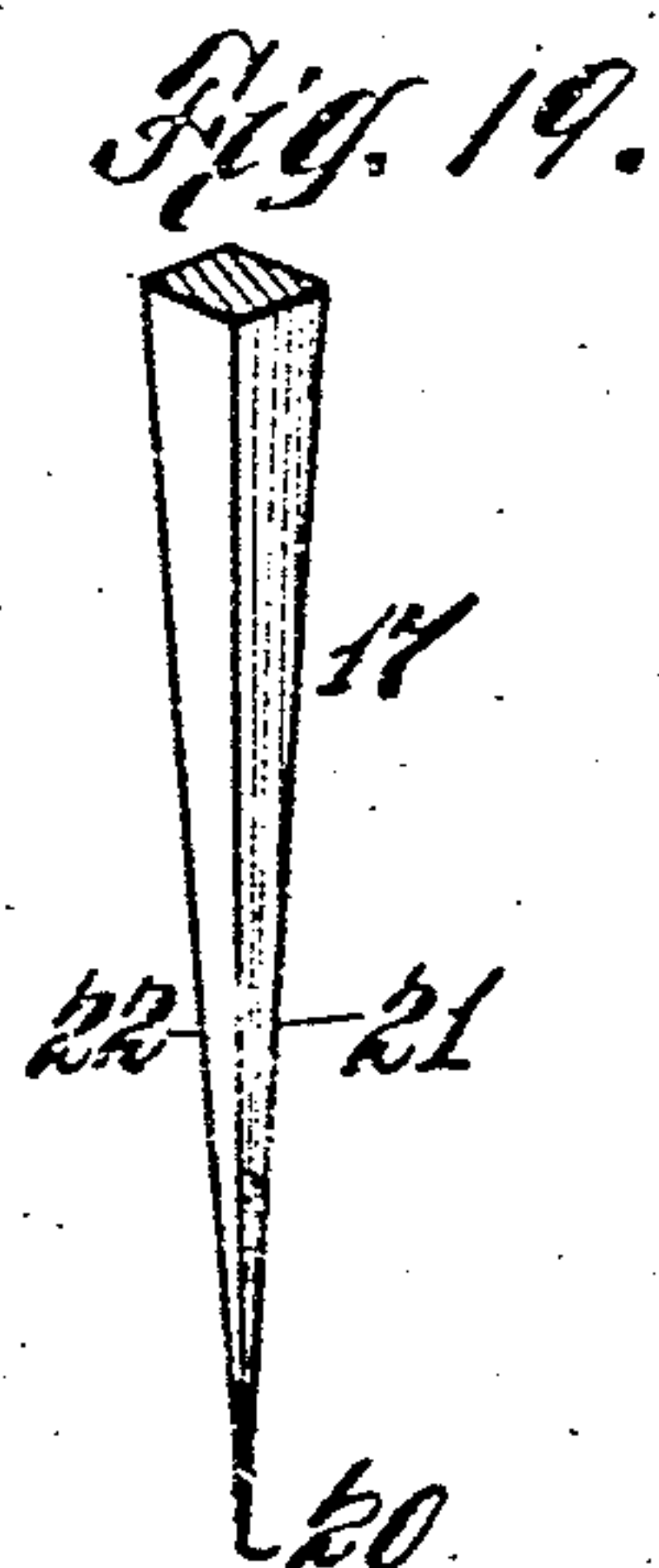
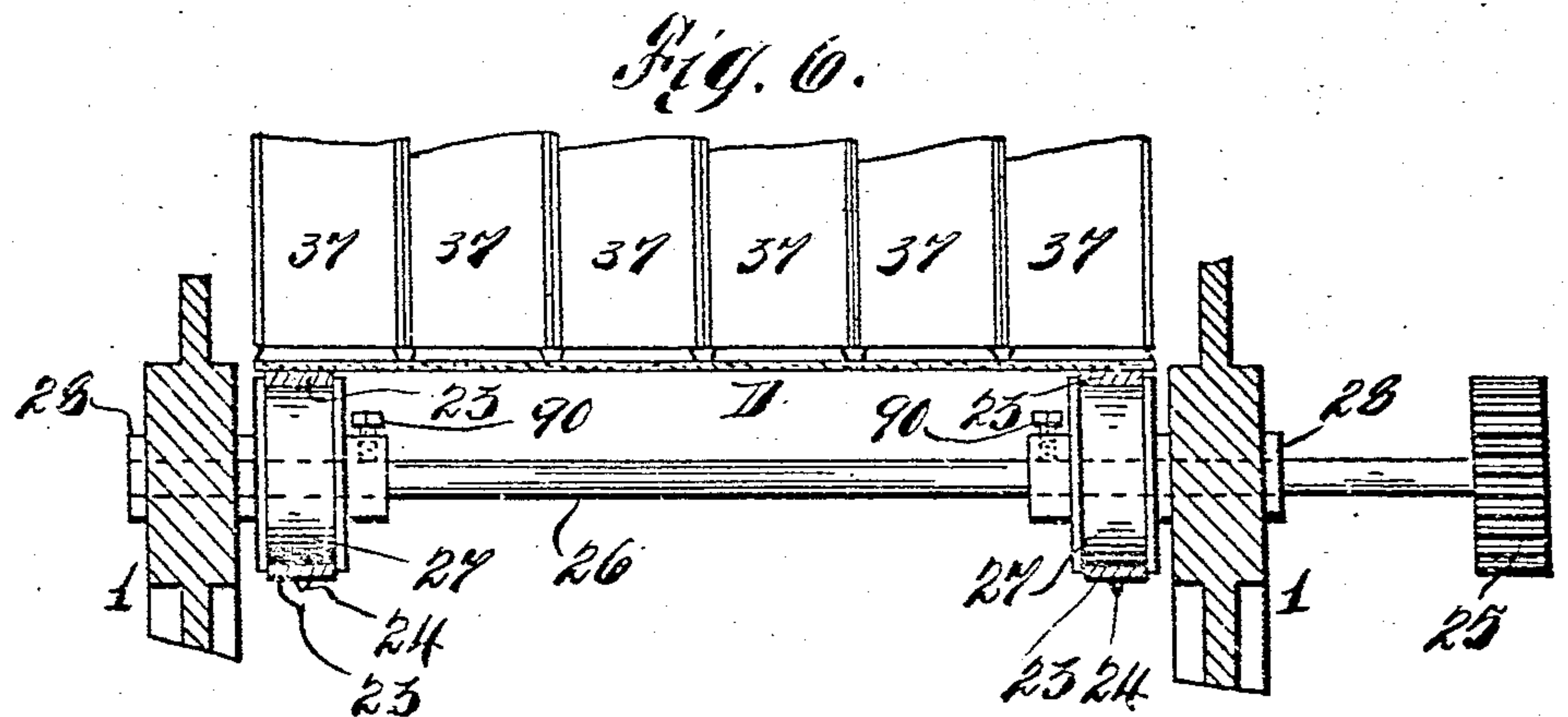
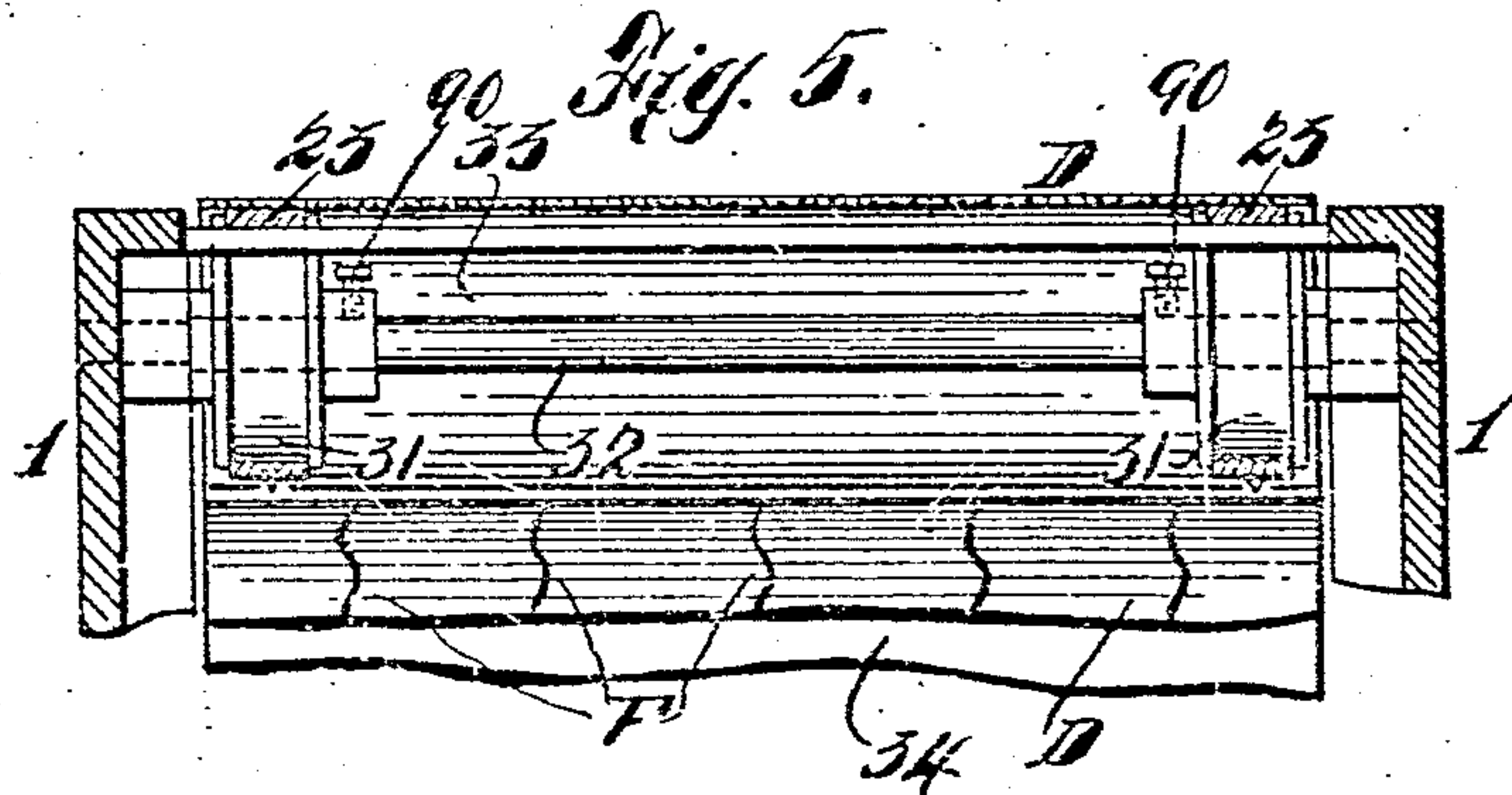
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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FABRIC-CUTTING MACHINE.

No. 879,675.

Specification of Letters Patent.

Patented Feb. 18, 1908.

Application filed October 30, 1906. Serial No. 341,204

To all whom it may concern:

Be it known that I, ARNOLD ROOS, a citizen of the United States, residing at South Norwalk, Fairfield county, State of Connecticut, have invented certain new and useful Improvements in Fabric-Cutting Machines, of which the following is a clear, full, and exact description.

This invention relates to fabric-cutting machines, and is especially designed to cut out fabrics in irregular lines or in a path adjacent to designs thereon, for instance, fabrics upon which lace designs are formed by embroidery or otherwise.

Embroidery lace is commonly formed upon sheets of fabric of considerable width, each sheet containing a plurality of such designs, and the designs so formed are, as far as I am aware, now cut from the sheets by hand.

The object of my improved machine is to cut out said plurality of designs simultaneously and automatically.

One of the special features of my improved machine constitutes a pantographically controlled cutting element which will follow the contour of the said designs.

To these and other ends which will hereinafter more fully appear, my invention comprises the various novel features of improvement and combinations and arrangements of parts or elements which I will now proceed to describe and finally claim, reference being had to the accompanying drawings, forming part thereof, wherein—

Figure 1 is a plan view of a fabric cutting machine embodying my invention, the fabric being broken away to show the feeding means; Fig. 2 is a longitudinal section thereof, on a reduced scale, the section being taken on a line *a—b* in Fig. 1; Fig. 3 is an enlarged end view, in detail, showing the mechanism for operating the cutting elements; Fig. 4 is an enlarged side elevation of the driving elements of my improved machine; Fig. 5 is an enlarged cross-section of my improved machine, the section being taken on a line *b—b* in Fig. 1, looking in the direction of the arrow; Fig. 6 is a similar view, the section being taken on a line *c—c* in Fig. 1; looking in the direction of the arrow; Fig. 7 is a fragmentary side elevation of the driving mechanism for the clutch; Fig. 8 is an enlarged front elevation of the pattern clutch; Fig. 9 is a side view thereof; Fig. 10 is a side elevation of the pattern-

holder; Fig. 11 is an end view thereof; Fig. 12 is a detail view of the pattern-plate before being bent around the holder; Fig. 13 is an enlarged vertical section of the carrier, slide and socket-members of the cutting-device; Fig. 14 is an enlarged detail view of the cutting blade and carrying plug; Fig. 15 is an enlarged plan view showing one detail of the controlling means for the cutting-blades; Fig. 16 is an enlarged fragmentary sectional view of a portion of one of the pressing-rolls, the operating gear therefor and connected steam-duct; Fig. 17 is an enlarged perspective view of the feeding belt and points thereon; Fig. 18 is a perspective view showing a piece of fabric having a design thereon and showing the blades in the act of severing the fabric; Fig. 19 is an enlarged perspective view of a portion of the cutting-blade; Fig. 20 is an enlarged detail perspective view of the pantograph stylus and pattern for oscillating the cutting-blades; Fig. 21 is an enlarged longitudinal central section of the clutch and pattern holder therein; and Fig. 22 is an enlarged sectional detail view of the adjustable slide carrying the blade-oscillating pin.

Like numerals and characters of reference are intended to indicate corresponding parts in the several views.

Referring to the drawings, especially to Figs. 1 and 2 for a general idea of my improved machine, the numerals 1, 1 indicate the side-frames of the machine, the same being of any suitable design. Adjacent to one end of each frame 1 a slide-rest 2 is provided, each of said slide-rests containing a guideway 3 into which a slide 4 is adapted to work. It will be seen that the frames 1, 1 diverge from the end A toward the end B, but this divergence may be dispensed with if desired. The slides 4 carry a cross-bar 5, from which is suspended a carrier or slide-rest 6 by means of suitable supports 7. In the carrier or slide-rest 6 a movable slide 8 is fitted, the underside of said slide having a guideway 9 (Fig. 13). The guideway 9 is provided for the purpose of adjustably supporting a socket-member 10, which is provided with a slide 11 adapted to slidably fit said guideway 9. In order to secure the socket-member 10 in a desired position, I provide a set-screw 12 suitably fitted to the socket-member 10, as shown. Said set-screw can be manipulated through the threaded socket 13, and in this socket a plug 14 is

adapted to fit, said plug being provided, at its lower end, with a threaded socket 15, into which the plug 16 of the cutting-blade 17 is adapted to snugly fit. The plug 14 has extending therefrom an arm 18, which is provided with a stud 19, the function of which will be hereinafter explained. By referring to Fig. 19 it will be seen that the blades 17 are of the bayonet variety, that is, tapered and meeting in a sharp point 20, the edges 21 and 22 being also ground to a knife edge. If the blades become dull or are broken they can be readily removed from the plug 14 without taking said plug from the socket 10.

One of the special features of my improved machine is to impart to the cutting element, which comprises the carrier 6, slide 8 therein, socket 10 and blades 17, a rapid vertical reciprocating movement whereby the blades are caused to rapidly pass through the fabric D, the vertical movement being sufficient to cause the blades to clear the fabric at each upward stroke, whereby at each downward stroke the blades enter the fabric at a new point slightly in advance owing to the forward movement, as hereinafter explained, of the fabric D. The fabric is fed against the cutting edges 22 (for instance) of the blade, the edges 21 also cutting on the downward stroke owing to the angular formation of the blade. In order to feed the fabric I, in this instance, employ traveling belts 23, which are provided with gripping means 24, which preferably comprise needle-points or the like.

The belts 23 are driven by means of a pinion 25 (Fig. 4) which is mounted upon a shaft 26, which in turn has adjustably fitted thereto belt-pulleys 27 (Fig. 6). The shaft 26 is carried by adjustable boxes 28, which, by means of the adjusting screw 29, can be drawn forward or backward to adjust the tension of the belts 23. The boxes 28 are in this instance slidably fitted in the jaw 30. At the other end of the machine the said belts 23 pass over transversely adjustable idle pulleys 31, which are slidably mounted upon a shaft 32 (see Figs. 2 and 5).

The feeding of the fabric will now be explained: Referring to Fig. 2, the fabric D, after having come from the embroidering machine will have formed thereon a plurality of designs, indicated diagrammatically by F, Fig. 1. After placing the sheet of fabric in a receptacle E, (a reel may be used if desired), the end thereof is passed through the idle rolls 33, 34, which will be sufficiently close together to put a tension upon the fabric, which is then placed upon the belts 23 and pressed upon the needle-points 24 until they have gripped. When the machine is started the belts 23 will feed the fabric toward the blades 17, and as the fabric travels it will be placed under an increasing tension the limit of which is adjacent to the blades 17, owing to the divergence of the belts 23; the object

being to cause the fabric to offer a resistance to the blades as well as to put the weave under tension whereby the blades will enter and cut the fabric much easier than if the said fabric was slack. After having passed the blades 17 the designs will have been cut from the cloth, as at G (Fig. 1) and, as the belts 23 will automatically leave the cloth a little further on the separated designs will be drawn through pressing rolls 35, 36 (Fig. 2), one of which, 35, for instance, may be heated by steam, or otherwise, a steam heating device being herein illustrated. After being pressed the cut out fabrics may be rolled up by any suitable means, a plurality of hand operated independent rolls 37 being illustrated for the purpose, said rolls being carried by a rotatable shaft 38 which is carried in jaws 39 upon the frames 1, 1, a crank-arm 40 being provided to operate the shaft 38.

As the contour of the designs will, in most cases, be an irregular line, and in order to cut the design out of the fabric neatly, it is essential to the fulfilment of the object of my invention that the blades 17 be turned or be given an oscillatory movement to follow the contour of said designs (see Fig. 18). For this reason the plugs 14 are screwed into the sockets 10, but do not touch the bottom of the openings 13 (see dotted lines Fig. 3), so as to provide a pivotal mounting thereof. The arms 18 of the plugs 14 are connected by a rod 41 (see Fig. 1), said rod being loosely mounted on the arm-studs 19 and provided with a jaw 42 upon one end thereof. To the jaw 42 a link 43 is fitted, which connects the rod 41 with a pivotally mounted jaw 44, said jaw being carried by a lever-arm 45 (Fig. 15) which, by means of the spindle 46, transmits movement from a flattened stylus 47 to said rod 41. The spindle 46 is pivotally mounted in a suitable bracket 48 which extends from one frame-member 1. The stylus 47 follows the contour 49 of the pantographic pattern 50, the said pantographic pattern being formed to correspond to the contour of the said designs F on the fabric. As the stylus 47 is flattened it will, as the pattern 50 rotates, accommodate itself to the said contour (see Fig. 20). The movement thus caused will be transmitted, through the elements described, to the blades 17, which will cause the blades to follow the contour of the design, the blades thereby receiving an oscillatory movement. The pattern 50 may be changed with every new design. A spring 41^a keeps the stylus 47 against the pattern 50.

In conjunction with the described oscillatory movement, a transverse reciprocating movement is also necessary in order to follow the design. To produce this latter movement on the part of the slide 8, I provide a pantographic pattern 51, which is mounted upon the holder or cylinder 53, which also carries the pattern 50, the pat-

tern 51 having an irregular contour 52, which is an exact counterpart of the design F on the fabric, and will be changed with every design. To cause the pattern 51 to operate the slide 8, I have herein illustrated an arbitrary pantographic device, comprising a lever 54 having a stylus 55, said lever being pivotally carried by a bracket 56 extending from the frame 1, the stylus being kept in contact with the contour of the pattern 51 by a spring 57. From the lever 54 movement is transmitted to a pivoted lever 58, mounted in a bracket 59 upon the frame 1, by means of a link 60. To the slide 8 I attach a bracket 61 which is in turn connected to the lever 58 by a link 62. It is obvious that as the pattern 51 rotates the lever 54 will be caused to oscillate and, through the elements described, the slide 8 will be caused to reciprocate transversely of the fabric, whereby, in connection with the operation hereinbefore described of oscillating the blades 17, the blades are caused to cut the fabric in accordance with the design thereon.

To start the machine preparatory to cutting out the designs, the fabric will have been passed through the rolls 33, 34 and placed upon the points 24 as hereinbefore described, the clutch 64 at this time containing no pattern-holder and the cutting element being free to be moved by hand to the extreme right position, for example, as shown in Fig. 3. The machine can then be started and the edge H of the fabric allowed to come up to the cutting edges 22 of the blades 17. For the sake of explanation, it will be assumed that the point I of the design F starts at the edge H of the fabric. When the blades 17 are at the extreme right position, the stylus 55 will be in the position as shown in Fig. 3, or the extreme left position. It will thus be apparent that the stylus 55 and blades 17 work oppositely to each other. After having brought the edge H of the fabric up to the blades, the machine can be stopped; the holder 53 can then be applied. As has been stated, the patterns 50, 51 are the exact counterpart of the designs F. Consequently the points of the contour of said patterns which correspond to the said point I and point J of the design F must be brought to the position of the said styluses 47 and 55. As these styluses are positioned at a right angle to each other, in this instance, the patterns will be placed upon the holder 53 in the same relative position, thus bringing the points I and J in proper place. In Fig. 3 the holder 53 is supposed to have been placed in the clutch 64 and fastened by the screw 66, in accordance with the foregoing statement. The machine can then be started. As the fabric D travels toward the blades, the pattern 51, which will then revolve, will cause the slide 8 to reciprocate transversely of the fabric a distance equal to the width of the design F, or the dis-

tance between I and J. The flattened stylus 47 will cause the blades 17 to turn in the direction of the contour of the design. As the blades are reciprocated (in the manner hereinafter described) and the fabric travels, the said blades will sever the fabric along the contour of the designs thereon. Owing to the angular formation of the said blades, they will, as they reciprocate, cut the fabric independently of the movement thereof, the feed of the fabric being simply to advance the design thereon toward the blades. The feed of the fabric and the reciprocation of the blades will be properly proportioned to fulfil the requirements. It will be apparent that the speed of the feed of the fabric and the peripheral speed of the patterns must be in the proper ratio.

By referring to Fig. 21 it will be seen that the gear 65 and clutch 64 thereon are loosely mounted upon the countershaft 66^a, and is for the purpose of permitting the clutch and the patterns held thereby to be given sufficient speed independently of the speed of the shaft 66^a. The gear 65 is operated through an idle gear 67 from the gear 68 carried by the shaft 69, which in turn operates the under pressing roll 36. To the other end of the said shaft 68 a driven pulley 69^a is attached which, by means of a belt 70, receives movement from a pulley 71 carried by the driving shaft 72, which carries a driving pulley 73, a driving belt 74 and a loose pulley 75. The gear 25 which drives the feeding belt 23, is driven from the gear 68 through an idler 76; a gear 70^a, which meshes with the gear 68, operating the upper pressing roll 35. By the foregoing arrangement of gearing, it is evident that the patterns 50, 51, pressing rolls 35, 36 and feed-belt 23 are all driven at the same speed, all of said gears, excepting the idlers, being herein shown as having the same pitch diameter. The countershaft 66^a is driven from the main shaft 72 by means of the pulley 77, belt 78 and pulley 79 upon said shaft 66^a. As the pulley 79 is somewhat smaller than the pulley 69^a, the shaft 66^a will be driven at a greater speed than the pressing rolls, feeding belt and patterns. The higher speed of said shaft is for the purpose of imparting to the carrier 6 and blades 17 a rapid vertical reciprocating movement, which is accomplished by an eccentric 80 mounted upon said shaft 66^a. The eccentric 80 by means of the strap 81, adjustable rod 82 and socket 83, imparts a reciprocating movement to the carrier 6. The upper end of the socket 83 is pivotally connected to the slide 4, as shown at 84. Both ends of the shaft 66^a are provided with said eccentric, strap, rod and socket.

By referring to Fig. 21 it will be seen that the gear 65 is loose upon the shaft 66^a, the pattern-holder 53 being held in the clutch 64 by the screw 66, the opening 53^a in the holder being sufficiently large to permit the said

holder and pattern thereon to be slipped over the end of the shaft 66^a and into the socket of the clutch. The clutch comprises the gear 65, which carries the aforesaid clutch member 64 having a socket 63. The aforesaid holder comprises a reduced cylindrical member 53^b and an enlarged cylindrical member 53^c which fits in the socket 63.

The pressing rolls 35, 36 are for the purpose of pressing or smoothing the fabric after it has passed the blades 17. In order to increase the smoothing or ironing effect, I heat the roll 35, for instance, by steam or otherwise. In Fig. 16 a steam heating device is illustrated for this purpose. The shaft 85 of the roll 35 is tubular and has fitted to the end thereof a steam pipe 86, as shown, said pipe being provided with a collar 87, which, by means of the cup 88 fastened to the web of the gear 70^a, causes the end 89 of the pipe to remain in contact with the end of the shaft 85. As the pipe 86 is suitably secured, the shaft 85, roll 35 and gear 70^a are free to revolve.

Referring now to the adjustably mounted pulleys 31, 31 and 27, 27 for the feed-belt 23: As the fabric D is usually of a certain width, still there are times when the width of the fabric will vary. The machine herein illustrated is constructed sufficiently wide to take the greatest width. In the event of narrower fabric being used, said pulleys 31, 31 and 27, 27 will be loosened by unscrewing the set-screws 90 and brought nearer together until the distance between the belts 23 is sufficient to take the narrower fabric, the divergence of said belts being retained. Owing to the construction of the slide 8 and the sockets 10, the blades 17 can be shifted to meet the requirements as to distance between the designs. In the event of the fabric containing fewer designs, some of the sockets and blades therein may be taken out. If it should be necessary to shift the sockets 10, the screw 91, which secures the rod 41 to the slide 92, may be loosened, the rod 41 being provided with a slot 41^b; the slide can then be removed, the pin 19 being pivotally supported in said slide, as at 93, a pin 94 being used to hold the elements together (see Fig. 22). After the sockets and slide 92 have been placed in proper position the screw 91 can be tightened. During the shifting operation the plugs 14 are removed and the screws 12 manipulated.

Referring now to another feature of my machine (the patterns and holder therefor, Figs. 10, 11 and 12), it will be seen that the holder 53, as has been stated, comprises the reduced cylindrical portion 53^a and the enlarged cylindrical portion 53^b. The portion 53^b is of a fixed diameter suitable for the socket 63 of the clutch 64. The diameter of the portion 53^a, however, varies as the measurement of the design upon the fabric varies.

It is evident that the length of the pattern 51 (Fig. 12), as also of pattern 50, should be equal to the length of the same number of points of the design upon the fabric; in other words, if twelve points of the design equal twelve inches, the patterns must be twelve inches long and contain twelve points. If this were not so, the blades could not be caused to follow the design by the pattern. Consequently the diameter of the portion 53^a of the holder 53 must be equal in circumference to the length of the inside periphery of the patterns 50, 51 when rolled. If the said twelve points equal eleven inches, the pattern and holder must be formed accordingly. For this reason I provide the clutch 64 and the removably mounted holder 53. The patterns are cut to correspond to the design in any suitable manner and from any suitable sheet material, and then bent around the holder and secured by any suitable means, the screws 92 being herein employed.

It will of course be understood that the details and construction of various features of my invention hereinabove described may be varied in many particulars without departing from the spirit and scope of my invention.

For the sake of a clear understanding of my improved fabric cutting machine, it may here be stated that the designs F upon the fabric D are not always equally spaced. It is to compensate for this unequal spacing that I mount the socket-members 10 for independent adjustment. The width of the fabric D varies and the number of designs thereupon also varies, and consequently I have mounted the feed belts 23 for transverse adjustment.

Having now described my invention, what I claim and desire to secure by Letters Patent is:

1. In a fabric cutting machine, the combination of a plurality of pivotally mounted independently adjustable cutting blades adapted to cut a plurality of similar designs from the cloth in an irregular line, a pantographic pattern to determine said line, means adapted to convey movement from said pattern to said cutting blades, and means for vertically reciprocating said blades.

2. In a fabric cutting machine, the combination of a plurality of pivotally mounted cutting blades adapted to cut the cloth in an irregular line, said blades being independently mounted and transversely adjustable, and means for controlling the travel of said blades to form a predetermined design.

3. In a fabric cutting machine, the combination of movable elements adapted to impart motion to a sheet of fabric, said fabric having thereon a design, a plurality of reciprocating cutting blades adapted to cut said fabric, means adapted to cause said cutting blades to follow the contour of said de-

sign, and means adapted to maintain said sheet under tension adjacent to said cutting blades.

4. In a fabric cutting machine, the combination of a diverging traveling belt provided with gripping means adapted to grip and feed a sheet of fabric, a plurality of adjustable pivotally mounted reciprocating cutting blades, a pantographic device adapted to cause said blades to cut said cloth to a predetermined design, pressing rolls, and means for heating one of said rolls.

5. In a fabric cutting machine, the combination of a diverging traveling belt, a gripping device carried by said belt and adapted to grip and feed a sheet of fabric, means for adjusting said belt horizontally, a cutting device, a pattern, means whereby the pattern will cause the cutting device to sever the fabric to correspond with the pattern, pressing rolls adjacent to said cutting device, and means for heating one of said rolls.

6. In a fabric cutting machine, the combination of a fabric feeding device and a cutting device, said cutting device comprising a vertically reciprocating carrier, a transversely movable slide mounted in said carrier, cutting blades independently adjustably mounted in said slide, and means adapted to impart to said slide a reciprocating transverse movement.

7. In a fabric cutting machine, the combination of a fabric feeding device and a cutting device, said cutting device comprising a carrier, a transversely movable slide mounted in said carrier, an adjustable pivotally mounted cutting blade carried by said slide, and means adapted to impart to said cutting blade an oscillatory movement.

8. In a fabric cutting machine, the combination of a fabric feeding device and a cutting device, said cutting device comprising a carrier, a transversely movable slide mounted in said carrier, an adjustable pivotally mounted cutting blade carried by said slide, means adapted to impart to said cutting blade an oscillatory movement, and means for imparting to said carrier a vertical reciprocating movement.

9. In a fabric cutting machine, the combination of a fabric feeding device, and a cutting device, said cutting device comprising a vertically reciprocating carrier, independently transversely adjustable cutting blades depending from said carrier and a pantographic device for imparting to said blades a reciprocating transverse movement.

10. In a fabric cutting machine, the combination of a fabric feeding device, and a cutting device, said cutting device comprising a vertically reciprocating carrier, a transversely movable slide mounted in said carrier, a plurality of independently transversely adjustable cutting blades mounted in said slide, and a pantographic device for

imparting to said slide a reciprocating movement.

11. In a fabric cutting machine, the combination of a fabric feeding device and a cutting device, said cutting device comprising a carrier, a movable slide mounted in said carrier, a pivotally mounted cutting blade carried by said slide, a pantographic device adapted to impart to said cutting blade an oscillatory movement, and a pantographic device for imparting to said carrier a vertical reciprocating movement.

12. In a fabric cutting machine, the combination of diverging traveling belts provided with pin-points adapted to grip and feed a sheet of fabric, said fabric having a design thereon, movable cutting blades adapted to sever said fabric, a rotary pattern adapted to cause said blades to follow the contour of said design, and means for imparting to said pattern and said belt an equal surface speed.

13. In a fabric cutting machine, the combination of traveling belts provided with means adapted to grip and feed a sheet of fabric having a design thereon, movable cutting blades adapted to sever said fabric, a rotary pattern adapted to cause said blades to follow the contour of said design, means for imparting to said pattern and said belt an equal surface speed, pressing rolls adjacent to said cutting blades, and means for heating one of said rolls.

14. In a fabric cutting machine, a frame, diverging traveling belts carried by said frame, pin-points carried by said belts adapted to grip and feed a sheet of fabric having thereon a design, movable cutting blades for severing said fabric, pressing rolls adjacent to said cutting blades, a rotatable shaft provided with means adapted to impart to said cutting blades a vertical reciprocating movement, a rotatable pattern carried by said shaft for causing said cutting blades to follow the contour of said design, and means for rotating said shaft.

15. In a fabric cutting machine, a frame, diverging traveling belts carried by said frame, means carried by said belts adapted to grip and feed a sheet of fabric having a design thereon, movable cutting blades for severing the fabric, pressing-rolls adjacent to the cutting blades, a rotatable shaft provided with means adapted to impart to said cutting blades a vertical reciprocating movement, a rotatable pattern loosely mounted on said shaft and adapted to cause said cutting blades to follow the contour of said design, means for rotating said shaft, and means adapted to rotate said pattern independently.

16. In a fabric cutting machine, a frame, traveling belts carried by said frame, means carried by said belts adapted to grip and feed a sheet of fabric having a design thereon, movable cutting blades for severing the fabric, a rotatable shaft provided with means

adapted to impart to said cutting blades a vertical reciprocating movement, a rotatable clutch loosely mounted on said shaft, a pattern removably secured to said clutch, said pattern adapted to cause the cutting blades to follow the contour of said design, means for rotating said shaft, and means for rotating said clutch independently.

17. In a fabric cutting machine, the combination of means for feeding fabric, reciprocating cutting elements, means for guiding the cutting elements, means for imparting to the cutting elements a reciprocating movement, and means for imparting to said cutting elements an oscillatory movement of varying degrees.

18. In a fabric cutting machine, the combination of means for feeding fabric, cutting elements adapted to sever said fabric, a shaft adapted to impart movement to said cutting elements, a rotatable clutch loosely mounted upon said shaft, a pattern adapted to be held by said clutch for guiding said cutting elements, and means for rotating said shaft and said clutch at different speeds.

19. In combination with a fabric cutting machine, a plurality of independently transversely adjustable cutting elements, and means adapted to impart to said cutting elements a combined reciprocating and oscillatory movement.

20. In a fabric cutting machine, the combination of a plurality of adjustable cutting blades adapted for an oscillatory movement of varying degrees, and a rotary pattern adapted to cause said blades to follow the contour of a design.

21. In a fabric cutting machine, the combination of traveling feeding device adapted to grip and feed a sheet of fabric having designs thereon, cutting blades, a pattern adapted to guide said blades transversely of said fabric, and a pattern adapted to give to said blades an oscillatory movement, the said feeding device being adapted to automatically separate itself from said cloth after said blades have cut the designs from said fabric.

22. A fabric cutting machine, comprising a frame, means adapted to feed a sheet of fabric carried by said frame, a cutting element also carried by said frame, said cutting element having opposed cutting edges adapted to pass through said fabric, means for reciprocating said cutting element, and means for imparting to said cutting element an oscillatory movement of varying degrees.

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Witnesses:

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