No. 671,917. Patented Apr. 9, 1901.

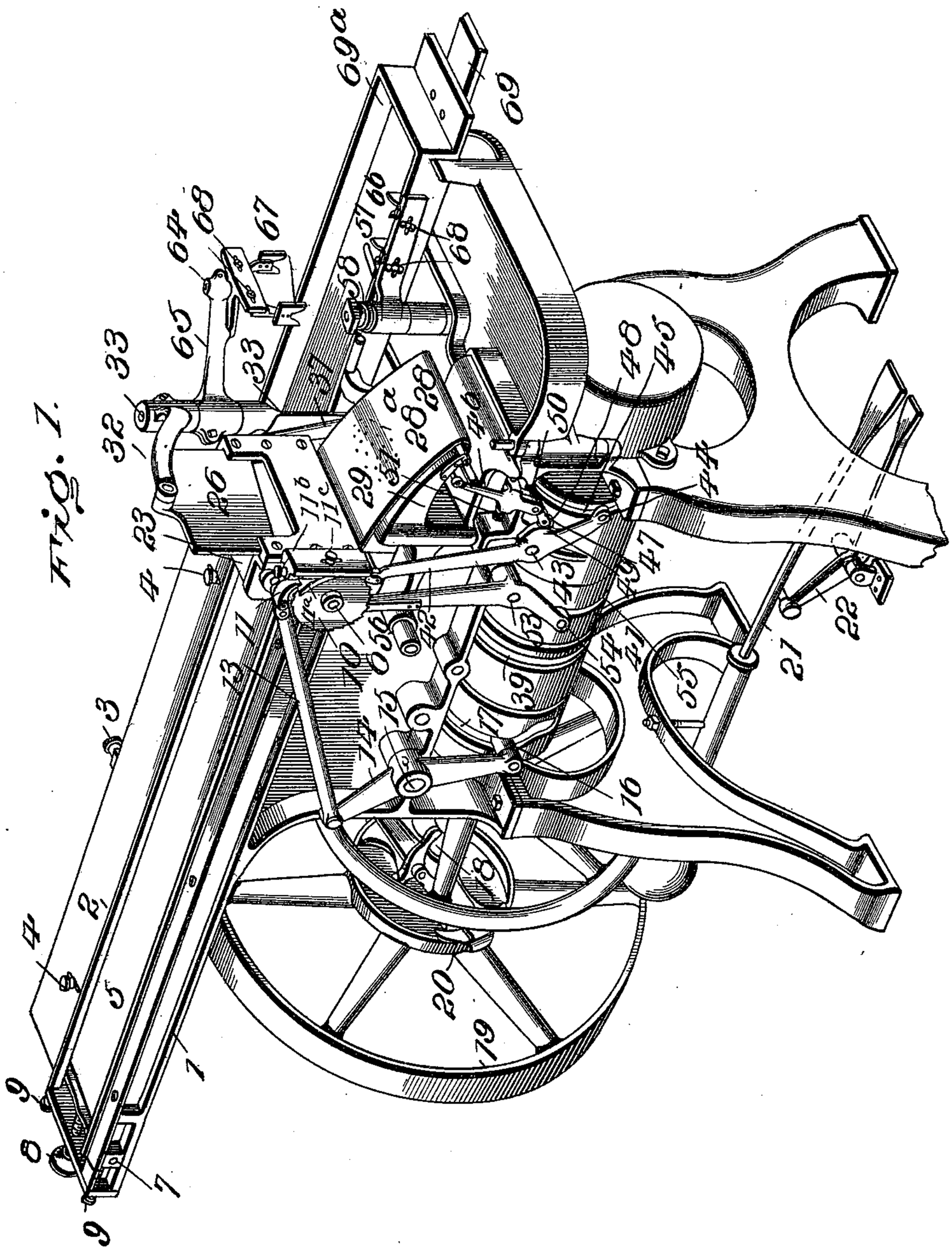
N. DU BRUL.

CIGARETTE MACHINE.

(Application filed Mar. 31, 1900.)

(No Model.) 6 Sheets—Sheet 1.

Fig. 1.



Witnesses

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(No Model.) 6 Sheets—Sheet 2.

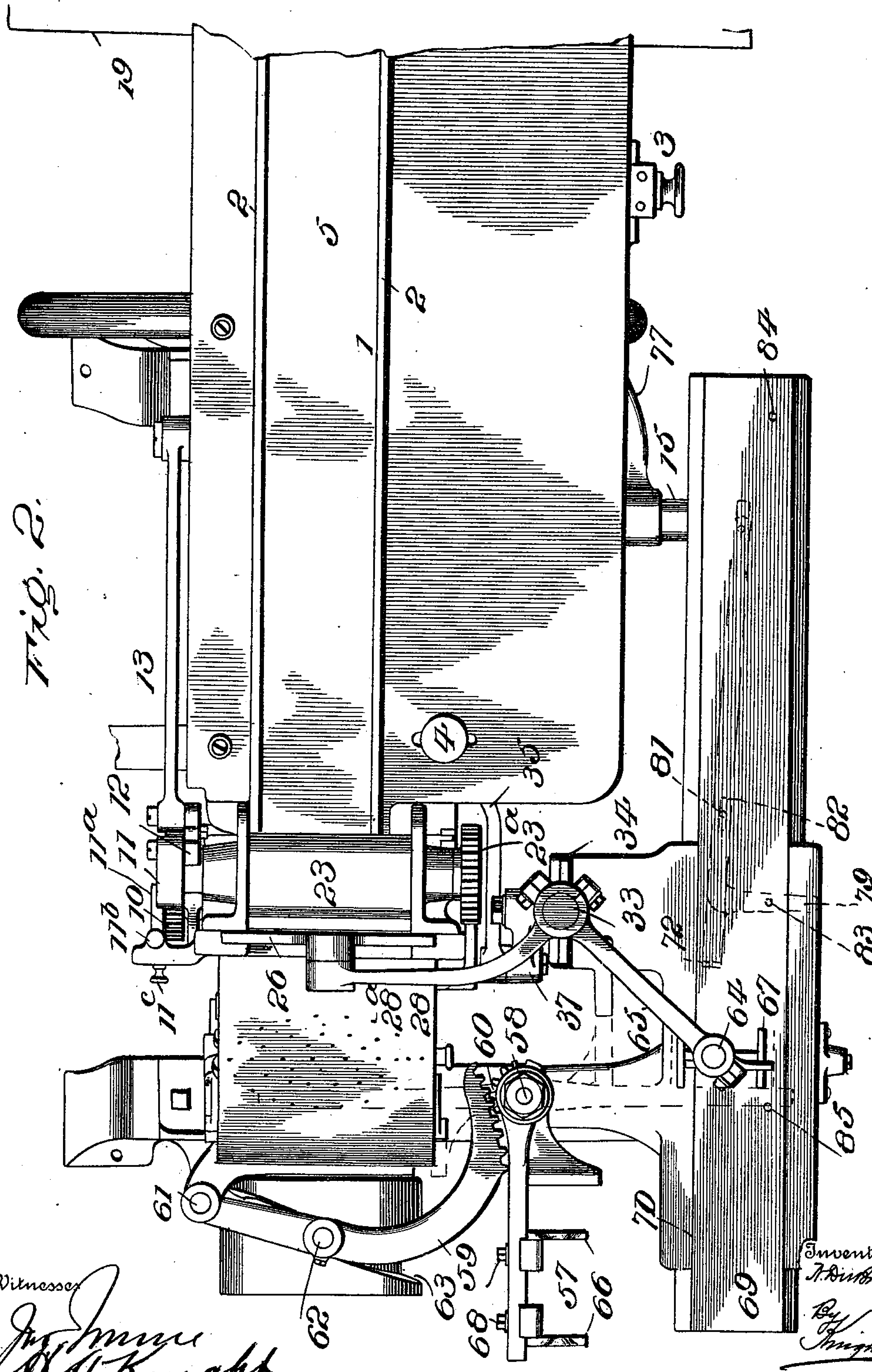

Fig. 2.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 671,917.

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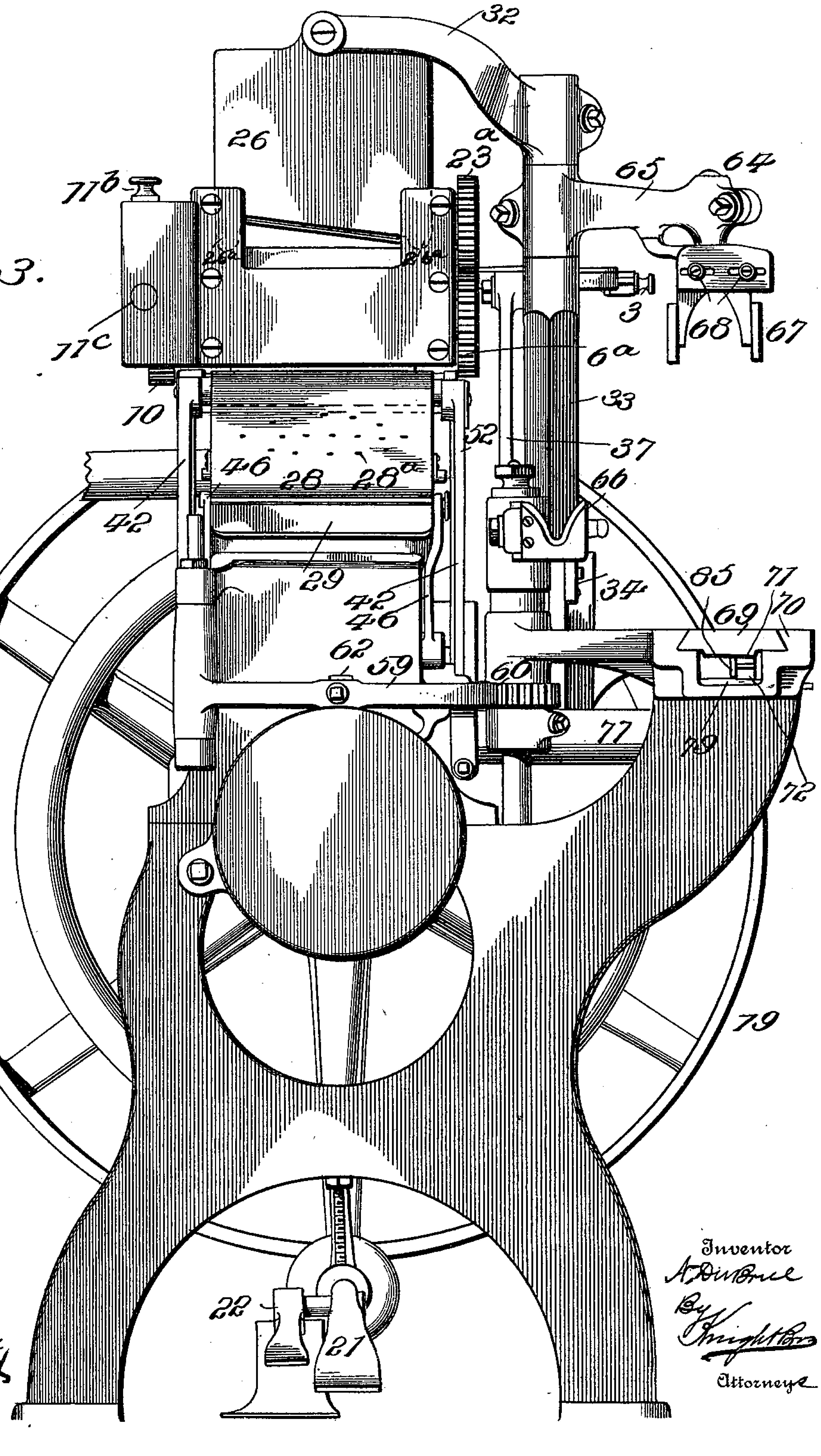
6 Sheets—Sheet 3.

Fig. 3.



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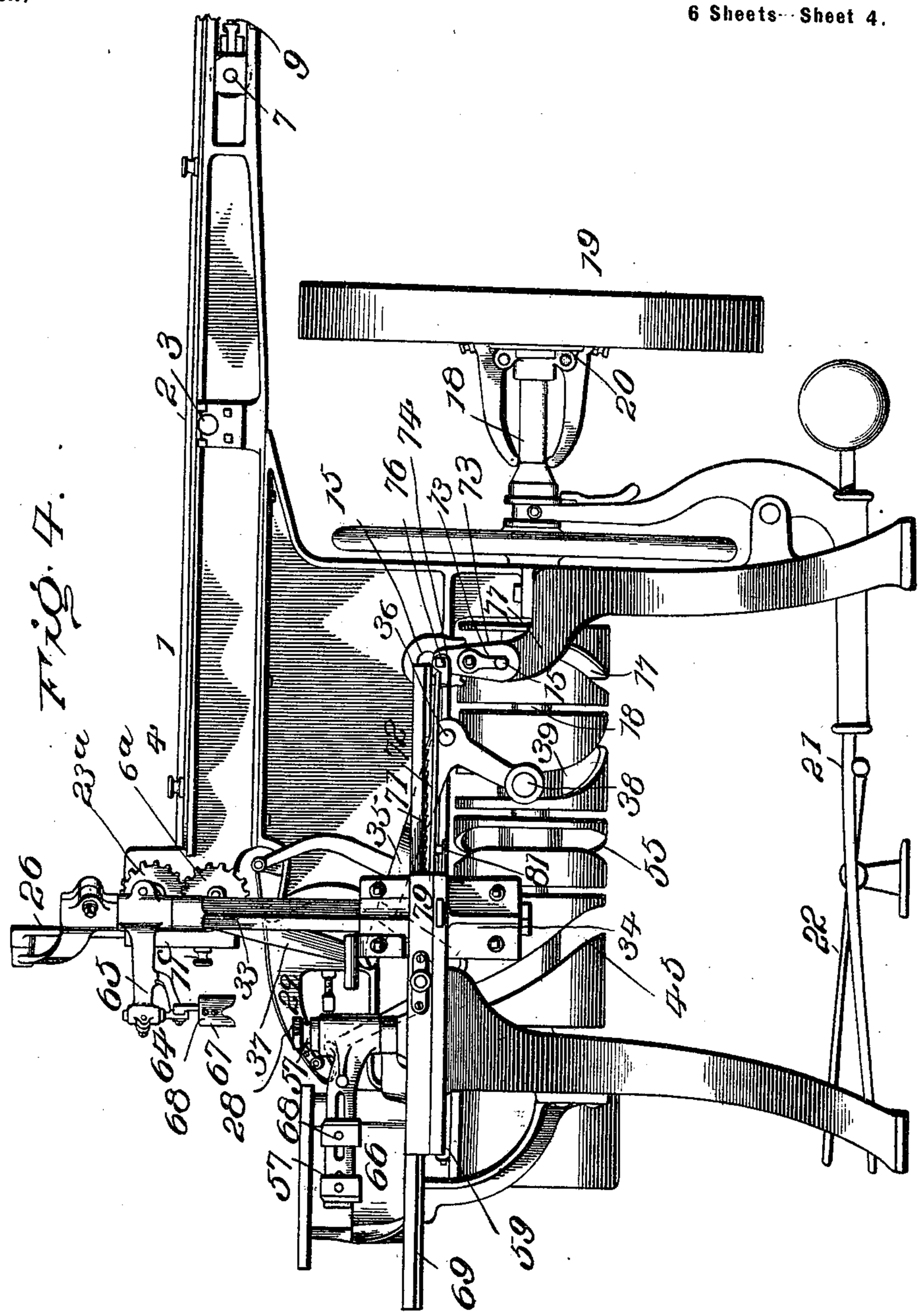
(No Model.)

6 Sheets—Sheet 4.

Fig. 4.



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(No Model.) 6 Sheets—Sheet 5.

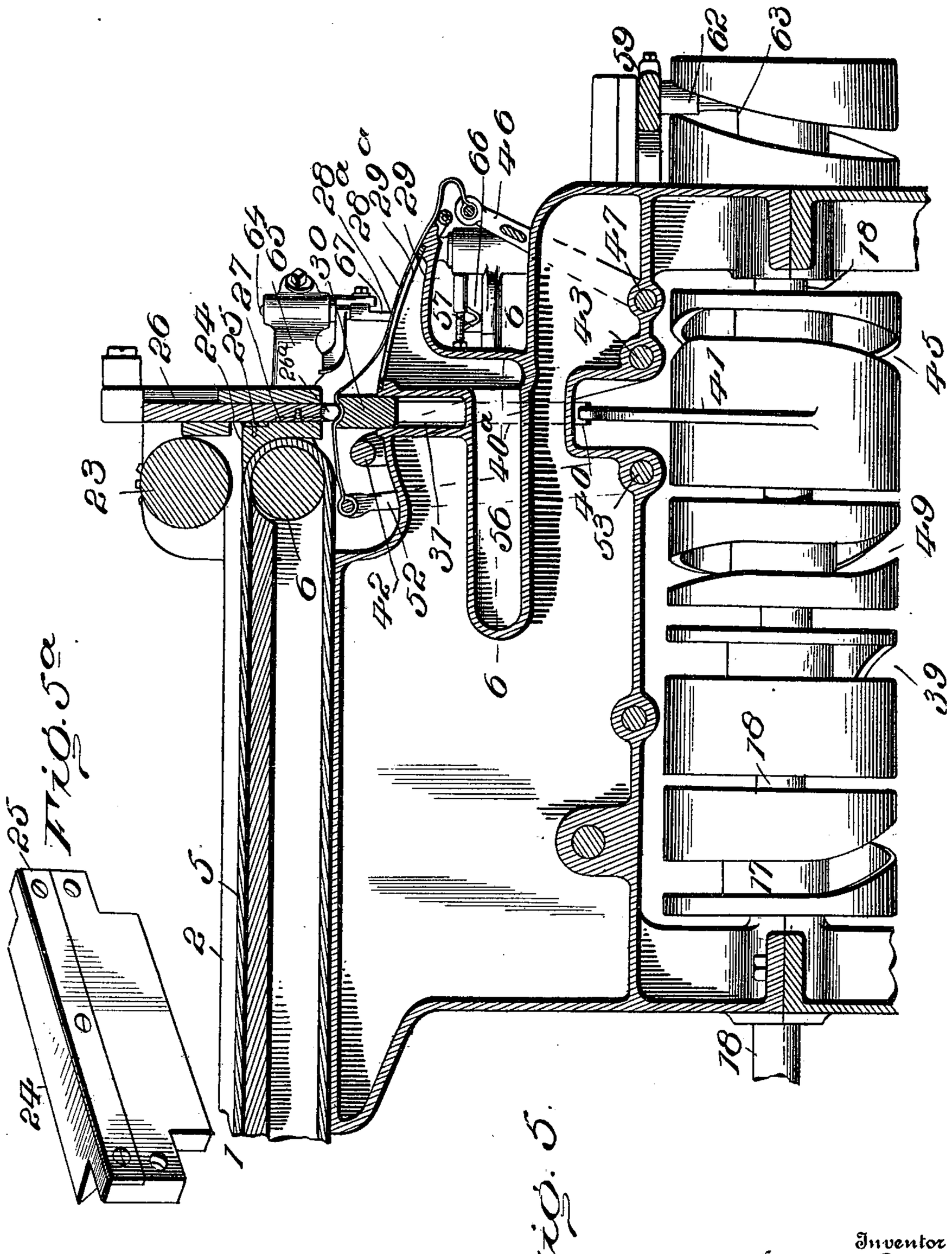

Fig. 5a

Fig. 5.

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(Application filed Mar. 31, 1900.)

(No Model.) 6 Sheets—Sheet 6.

Fig. 6.

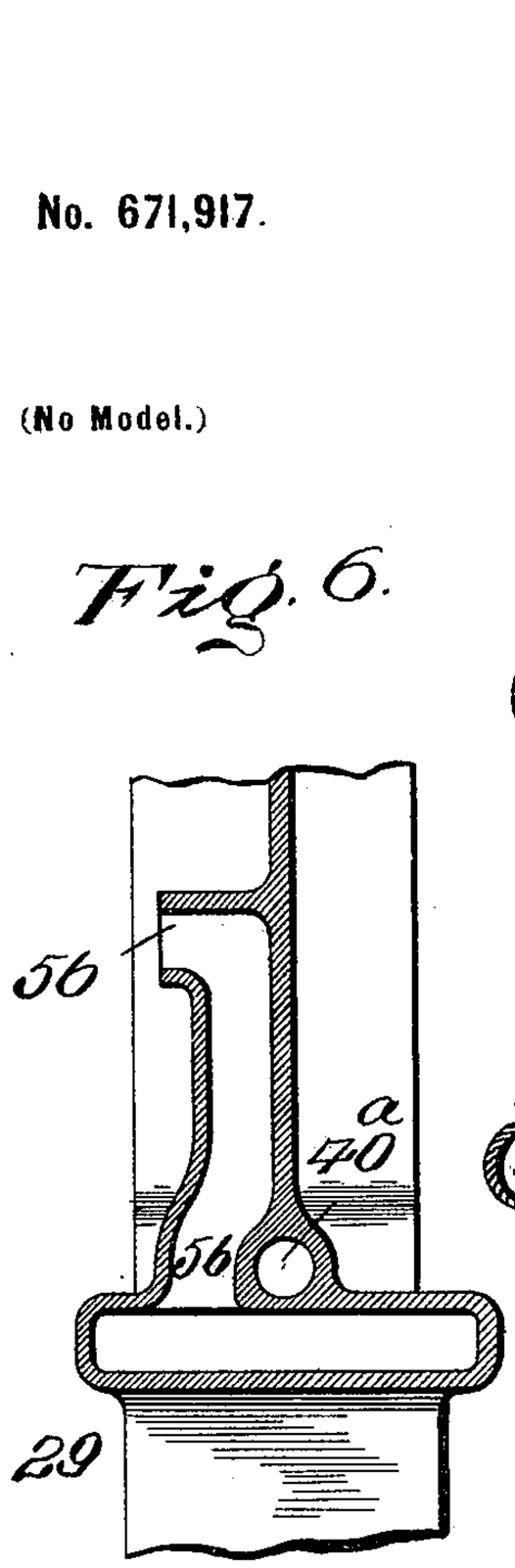


Fig. 7.

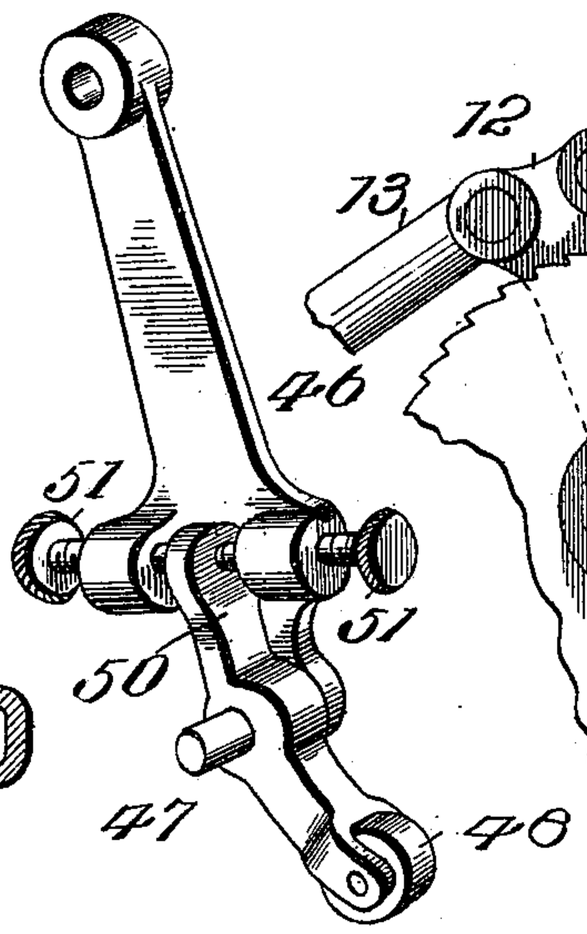


Fig. 8.

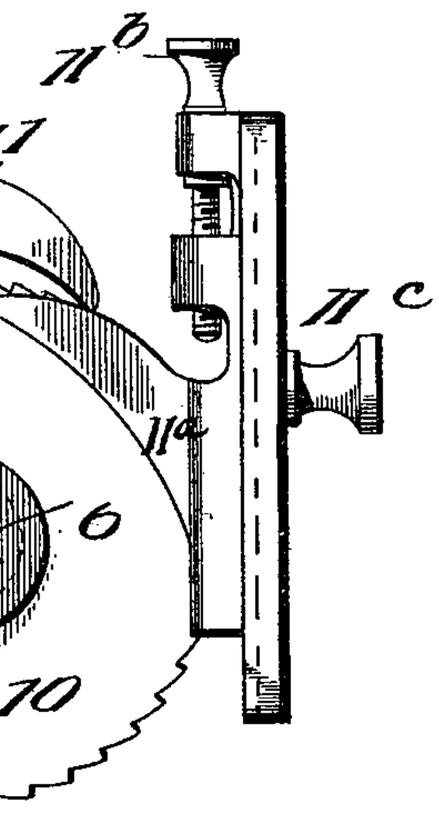
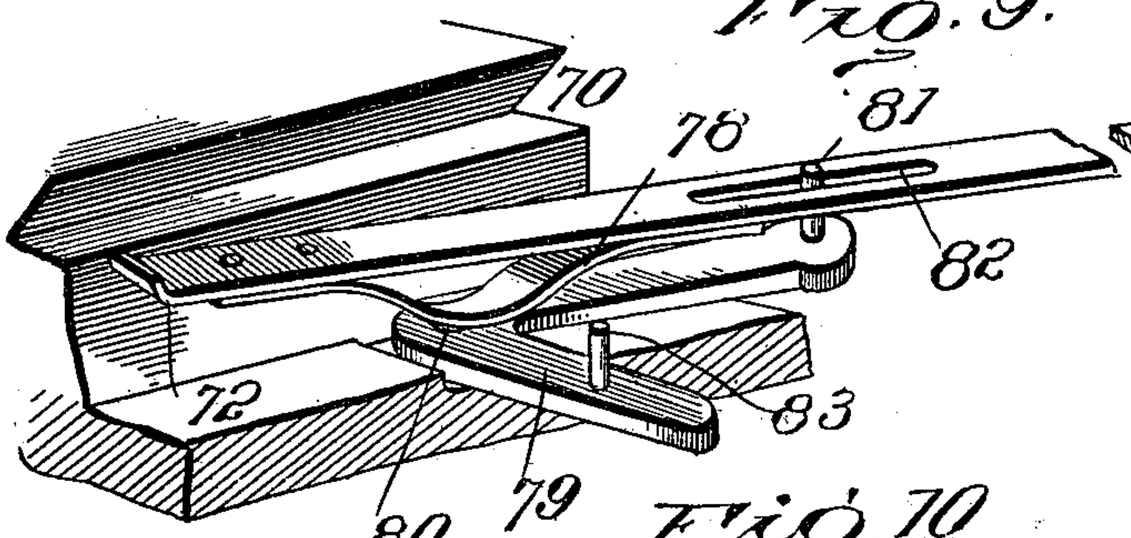


Fig. 9.



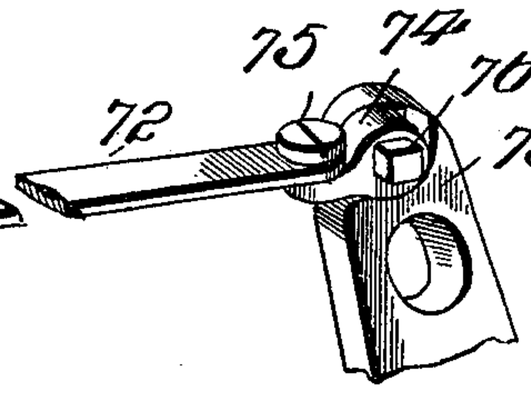


Fig. 10.

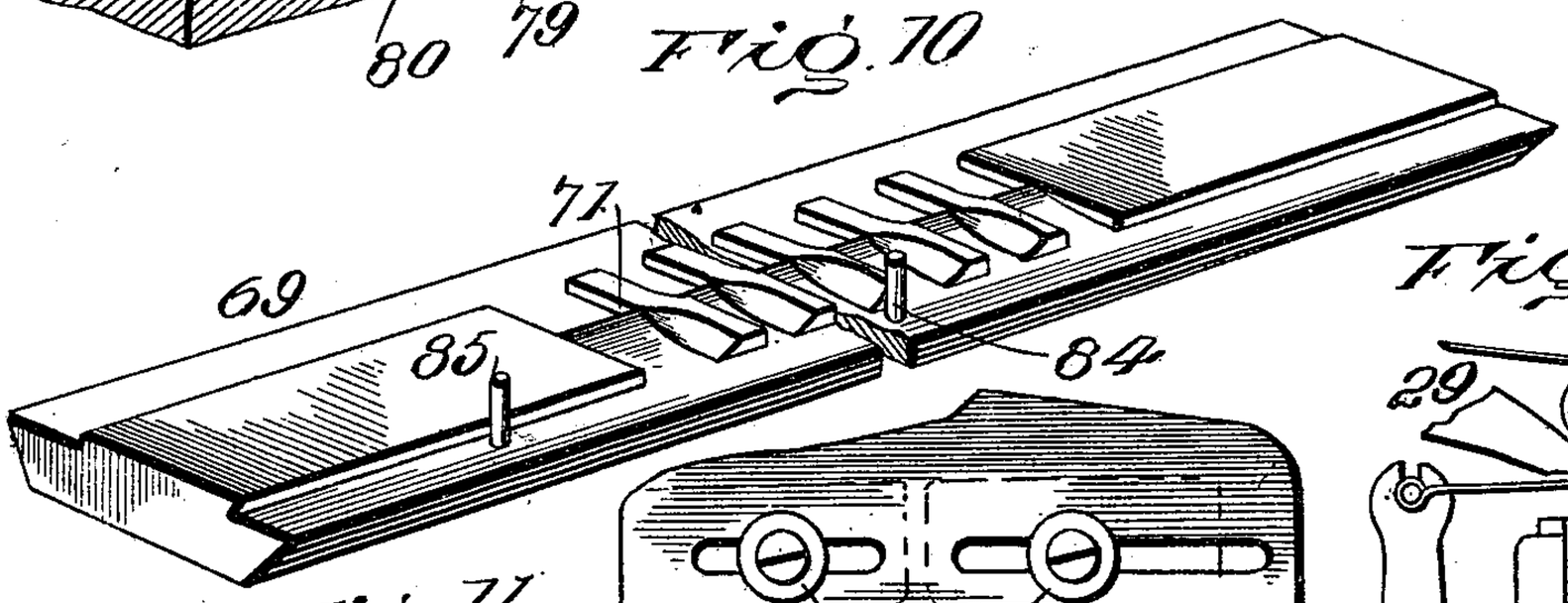


Fig. 11.

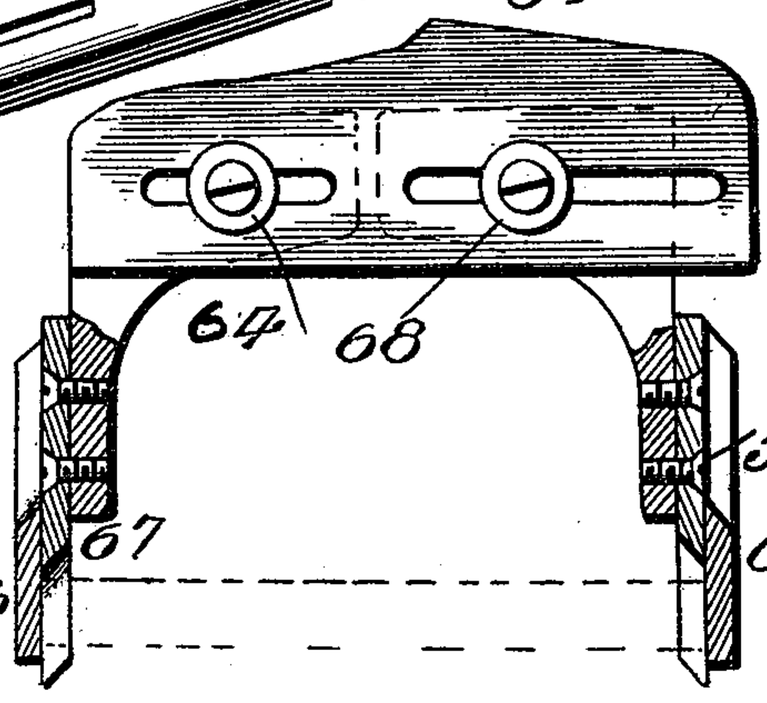
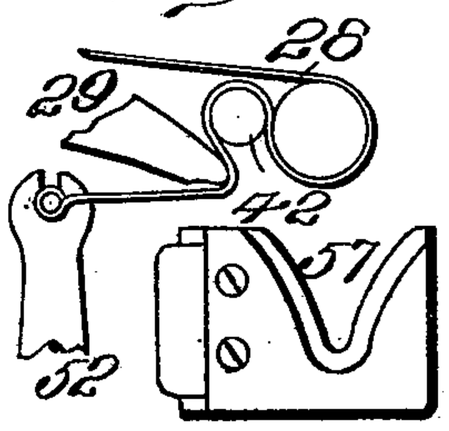


Fig. 12.



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UNITED STATES PATENT OFFICE.

NAPOLEON DU BRUL, OF CINCINNATI, OHIO.

CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 671,917, dated April 9, 1901.

Application filed March 31, 1900. Serial No. 10,991. (No model.)

To all whom it may concern:

Be it known that I, NAPOLEON DU BRUL, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Cigarette-Machines, of which the following is a specification.

My invention is designed more particularly for the manufacture of what are commonly called "all-tobacco cigarettes" or cigarettes made of a suitably-cut filler and a single wrapper of tobacco-leaf; and my invention has for its object to provide a simple and effective machine that will feed the filler material, take a suitable portion thereof and deposit it into the pocket of an apron on the rolling-table, roll the wrapper about the filler, discharge the rolled cigarette into a carrier, trim the ends of the cigarette, and deposit the finished cigarettes as fast as they can be made in a receptacle.

To these ends my invention is carried out, generally speaking, by providing a traveling feed-apron forming the bottom of a tray in which the filler material is distributed and the lateral dimension of which is adjustable to regulate the width of the body of material being fed; means for advancing the feed-apron step by step to feed forward intermittently sufficient material to form successive charges of filler and adjustable to vary the quantity of filler material fed at each step; a cutting-plunger working past a shear-plate at the discharge end of the feed-apron cutting off and passing downward at each stroke the quantity of tobacco supplied by the apron for the filler; a rolling-table; a rolling-apron upon the table, forming a pocket into which the cutting-plunger discharges and having front and rear apron supporting and tightening levers, of which the front apron supporting and tightening lever is formed in two parts relatively adjustable to regulate the tension put upon the apron; means for creating an air-suction through the apron to hold a wrapper in place thereon; a cigarette-carrier upon which the apron discharges the rolled cigarette and by which the cigarette is removed to a point above a tray into which it is to be deposited and a plunger by which the cigarette is discharged from the carrier into the tray, said carrier and discharging-plunger being constructed in the form of the lower and upper jaws of a pair of cutters spaced apart by the length which is to be given to the cigarette and performing the function of trimming the cigarette to uniform length simultaneously with its deposit in the tray, and an automatically shifting and reversing tray-holder by means of which the receptacle for the cigarettes is gradually fed from end to end back and forth beneath the discharge-point of the carrier to cause the cigarettes to be deposited in the tray as they are discharged.

My invention will be fully understood upon reference to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a perspective view of a complete machine constructed in accordance with my invention. Fig. 2 is a plan of the same. Fig. 3 is a front elevation. Fig. 4 is a side elevation. Fig. 5 is a vertical sectional detail view on an enlarged scale. Fig. 5ª is a detail view of the shear-plate forming the front end of the feed-tray. Fig. 6 is a horizontal sectional view on the line 6 6, Fig. 5. Fig. 7 is a detail view of the adjustable two-part front supporting and tightening lever for the apron. Fig. 8 is a detail view of the step-by-step feeding mechanism for the feed-apron, together with the means for adjusting the feed. Fig. 9 is a detail view of the automatically-reversing step-by-step feed mechanism for the receiving-tray support. Fig. 10 is a bottom plan view of the receiving-tray support. Fig. 11 is a sectional detail view of the discharging-plunger forming the upper member of the trimming-cutter, which performs the double function of trimming the ends of the cigarettes and placing them in the receiving-tray. Fig. 12 is a detail view showing the relation of the cigarette-carrier which forms the lower member of said discharging and trimming device to the discharge end of the rolling-table.

1 represents the feed-tray, which is provided with an adjustable side 2, by which the width of the layer of tobacco to be fed by said tray may be regulated at will, said side 2 being adjustable through the medium of a screw 3 and fixed to its adjustment by set-screws 4.

5 is an endless apron forming the bottom of the tray 1 and traveling around the front feed-roller 6 and the rear guiding and stretching roller 7, the latter being provided with a central adjusting-screw 8 and lateral alining and fixing screws 9.

Intermittent rotation or step-by-step feeding motion is imparted to the roller 6 through the medium of a ratchet-wheel 10, fixed to said roller, and a dog 11, mounted upon an arm 12, which swings about the axis of said roller 6 and has connection through a pitman 13 with a lever 14, which is fulcrumed at 15 upon the frame of the machine and carries a stud 16, which enters a cam 17 on the main shaft 18 of the machine. The degree of rotation of the ratchet 10 by the dog 11 is determined by the duration of engagement of said parts. To vary this duration of engagement at will, I provide a displacing-segment 11ª, which intersects the arc in which the engaging end of the dog moves, and as said dog moves in the direction of engagement with the ratchet the segment 11ª deflects the dog out of engagement with the ratchet. The segment 11ª may be adjusted vertically by a screw 10ᵇ and fixed to any adjustment by a screw 10ᶜ, and thus the point of disengagement of the dog, and consequently the degree of rotation of the ratchet by the dog, may be varied at will.

The main shaft 18 extends longitudinally through the machine and carries a drive-pulley 19 at its rear end, which makes turning connection with said shaft 18 through the medium of a clutch 20, controlled by foot-levers 21 22. Said shaft 18 also carries other cams for actuating other parts of the machine referred to.

As will be best understood upon reference to Fig. 5, the apron 5 feeds the tobacco beneath a roll 23, which is rotated through gear 23ª on its own shaft, and intermeshing gear 6ª on the shaft of the roller 6, and by which the layer of tobacco is condensed, and then upon the shear-plate 24, having the replaceable shearing edge 25, where the quantity of tobacco fed forward by each advance of the apron 5 is severed by a plunger 26, carrying a cutting-plate 27, which coöperates with the edge 25, and by said plunger carried down and deposited upon the apron 28 of the rolling-table 29. 30 represents a follower that coöperates with the plunger 26 in a manner to raise the apron 28 to receive the charge of filler material in order to prevent scattering or disarrangement thereof, and then recedes into the depression 31 of the frame to permit the apron to form the pocket in which to roll the cigarette. The cutting-plunger 26 is provided with spacing-lugs 26ª at its respective lower corners to push down the apron and prevent pressing the tobacco too hard between the cutting-plunger and the rolling-apron. The plunger 26 is reciprocated vertically through the medium of an arm 32, projecting from the upper end of a slide-rod 33, Figs. 1 and 3, which is reciprocated in a bearing 34, Fig. 4, by means of the bell-crank lever 35, fulcrumed at 36, connected through a pitman 37 at its forward end to said rod 33 and at its rear lower end provided with a stud 38 that enters the cam 39 on the main shaft 18. The follower 30 carries a shank 40, that reciprocates in a bearing 40ª, Fig. 6, and rests upon a cam-horn 41, that rotates with the main shaft 18.

42 represents the rolling-lever, which is fulcrumed at 43 and carries upon its end below the fulcrum a stud 44, engaging in cam 45, by which the rolling-lever is oscillated at the proper time to perform the rolling action in connection with the apron 28.

46 represents the front tightening and supporting lever for the apron 28, which lever is fulcrumed at 47 and carries a roller 48 on its lower end, that engages a cam-boss 49 on the rolling-lever 42 in such a manner that the necessary tension and relaxation of the rolling-apron 28 take place at the proper time relative to the action of said rolling-lever.

As will be seen upon reference to Fig. 7, the lever 46 is formed in two parts relatively movable upon the fulcrum-pin 47 of the lever and of which the lower part carries a projecting end 50, that extends above the fulcrum and terminates between a pair of set-screws 51, carried by the upper portion of the lever 46. By turning the set-screws 51 in suitable directions the angle between the respective parts of the lever 46 may be changed at will, and inasmuch as the throw of the upper end of said lever is determined by the impingement of the roller 48 on the cam-boss 49 it follows that the tension on the apron 28 will be changed accordingly. The upper portion of the lever 46, with the exception of the adjusting-screws, is duplicated on opposite sides of the machine and the parts connected in rigid relation by the fulcrum-rod 47. 52 represents the rear tightening and supporting lever for the apron, the same being fulcrumed at 53 and having its lower end provided with a stud 54, that engages with the cam 55 on the main shaft 18 to impart to said lever the necessary oscillation to tighten and relax the apron in the rolling operation. The objects and effect of these supporting and tightening levers are as follows: During the rearward movement of the rolling-lever the cam 55 moves the upper end of the lever 52 and relaxes the rolling-apron sufficiently to form the pocket to receive the filler material to be rolled; but as soon as the rolling operation commences said lever 52 is moved in the opposite direction to put the necessary tension on the apron to insure proper rolling. As the rolling-lever approaches the discharge end of the table its cam-boss 49 permits a slight backward movement of the upper end of the lever 46 and takes up the extra slack of the rolling-apron as the cigarette rolls down to be discharged. To provide for holding the wrapper in place upon the rolling-apron, the roll-

ing-table 29 is formed with an air-chamber, as shown in Fig. 5, from which air is exhausted through the passage 56, as best seen in Figs. 5 and 6, the table having its rolling-surface slotted, as shown at 29ª, and the rolling-apron 28 is provided with perforations 28ª, which permit air to be exhausted beneath a wrapper laid accurately in position when placed thereon until rolling takes place. From the rolling-apron 28 the rolled cigarette is discharged into a carrier 57, as best seen in Fig. 12, and, as shown in Figs. 1, 2, &c., said carrier is mounted upon an oscillating post 58, which receives its motion from an arm 59, having toothed connection at 60 with said post and fulcrumed at 61, while a pin 62 enters the cam 63 on the extreme front end of the main shaft 18. (See Figs. 2 and 3.) By these connections the cigarette discharged from the end of the rolling-table is carried over to a point vertically above the receiving-tray 69ª, Fig. 1, where it comes vertically beneath a discharging-plunger 64, supported by an arm 65 from the vertically-sliding rod 33, hereinbefore referred to.

The carrier 57 and plunger 64 are each constructed with a pair of cutters 66 67, adjustably secured through the medium of set-screws 68, so that they may be made to correspond to different lengths of cigarettes to be trimmed and arranged so that their cutting edges pass shearwise by the downward movement of the discharging-plunger 64 and trim the ends of the cigarette simultaneously with discharging it into the receiving-tray 69ª. To provide a support therefor and to move the receptacle intermittently, so that each cigarette is placed in a new position, and to reverse the shifting or intermittent movement of the receptacle, so that the cigarettes are arranged in successive layers, I provide a support 69, mounted in a dovetail bearing 70 and provided on its under face with ratchet-teeth 71, which are engaged by a dog 72, that is reciprocated by a crank-arm 73, said connection being through the medium of a link 74, having horizontally-pivoting connection 75 with the dog 72 and vertically-pivoting connection 76 with the crank-arm 73. (See Fig. 9.) The crank-arm 73 is carried on the right-hand end of the rock-shaft 15, having bearing in brackets 77 and extending transversely through the machine and providing a fulcrum for the lever 14, hereinbefore referred to. The lever 14 is fixed upon the rock-shaft 15, and said shaft is therefore oscillated by the cam 17, operating upon the stud 16, heretofore described, for giving motion to the tobacco-feed. Upon reference to Fig. 10, which shows the support 69 in inverted position, it will be seen that the ratchet-teeth 71 on the under side of said support are of peculiar construction, in that they have the sliding and engaging faces on opposite sides of the middle line alternated in positions, so that when the dog 72 is engaging them on the inner side of the middle line, which is the near side in the inverted position of the ratchet, (shown in Fig. 10,) said dog will slide over the ratchet as it moves to the rear of the machine, but will engage the ratchet and advance the support 69 by each forward movement of the dog, whereas when the dog is in line with the outer side of the ratchet, or the far side in the inverted position, (shown in Fig. 10,) the dog will slide over the ratchet in its forward movement, but will engage a tooth and draw the support 69 each time that the dog moves to the rear of the machine. To hold the dog in engagement with the ratchet, it is provided with a spring 78, Fig. 9. To automatically shift the dog from one side to another each time it reaches the end of the ratchet, I provide a bell-crank lever 79, pivoted at 80, having on its rearwardly-projecting end a pin 81, that enters an elongated slot 82 in the dog 72 and on its laterally-projecting end a pin 83, that is in the path of pins 84 85 on the sliding support 69. Each time the support 69 arrives at the rearward limit of its movement the pin 85 will engage the pin 83 and rock the lever 79, so as to throw the dog 72 into the line of the inner side of the ratchet-teeth; but when the sliding support 69 reaches the forward limit of its movement the pin 84 will engage the pin 83, rock the lever 79 in the opposite direction, and throw the dog 72 into the line of the outer side of the ratchet. The link 74 affords vertical and lateral flexibility to the connection of the dog 72. By these means the sliding support 69 continues a step-by-step movement, first in one direction until it reaches the limit of its movement, then automatically reverses and proceeds step by step to the other limit of its movement, and so continues. As each step in the movement in either direction corresponds to about the width of a cigarette, it follows that the cigarettes will be laid side by side and in successive layers.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination of means for feeding tobacco, the vertically-reciprocating cutting-plunger, the rolling-apron beneath said plunger, the follower beneath said apron, raising the latter to receive the charge of tobacco from the plunger, means for actuating said parts, and the spacing projections carried by the plunger projecting beyond the plane of the cutting edge of the plunger to prevent said edge contacting with the rolling-apron, substantially as herein explained.

2. In a machine of substantially the character described, the combination of a rolling-table, the rolling-apron, means coöperating with said apron to perform the rolling operation, and a tightening and supporting lever for the end of said apron, having means for oscillating it to stretch and relax the apron at the proper times, and constructed in two

parts relatively adjustable to regulate the tension put upon the apron through said lever; substantially as herein set forth.

3. An apron stretching and supporting lever having a fulcrumed pin and formed in two parts relatively movable upon the fulcrum-pin of said lever, a projection on one of said parts overlapping the other, and adjustable means carried by said other part engaging the overlapping end to fix the angle between the parts at will; substantially as herein set forth.

4. A stretching and supporting lever for rolling-aprons, provided with a fulcrumed pin and constructed with two parts relatively movable upon the fulcrum-pin of the lever, extending in different directions from said fulcrum-pin, one serving for the attachment of the apron and the other serving for the impingement of the means which controls the movement of the lever, and provided with an overlapping end, and adjusting-screws engaging said overlapping end to adjust said parts relatively upon their fulcrum-pin; substantially as herein set forth.

5. In a machine of substantially the character described, the combination of a rolling-table having an apron and means coöperating therewith to roll the cigarette, and a cigarette-carrier movable between the discharge end of the rolling-table and a point of delivery, and constructed in the form of a cutter for the ends of the cigarette; substantially as herein set forth.

6. In combination with the rolling-table of a cigarette-machine and the apron and rolling mechanism thereof, a cigarette-carrier movable from the discharge end of said table to a point of delivery, constructed to form cutters for trimming the ends of the cigarette, and a plunger coöperating with said carrier to discharge the cigarette therefrom and effect the cutting operation at the same time, substantially as herein set forth.

7. In combination with the rolling-table and the apron and rolling mechanism coöperating therewith, a cigarette-carrier constructed in the form of a pair of cutting-knives upon which the cigarette is delivered by the apron, and a discharge-plunger movable vertically at the point of delivery, constructed to provide cutters coöperating with the cutters of the carrier, and serving to simultaneously discharge and trim the cigarette; substantially as set forth.

8. In combination with the rolling-table, the rolling-apron and the coöperating rolling parts of a cigarette-machine, a cigarette-carrier movable from the discharge end of the rolling-table to a point of delivery, and consisting of V-shaped knives spaced apart by the length to be given to the cigarette, and receiving the cigarette upon said knives, and a coöperating discharging-plunger for simultaneously cutting and discharging the cigarette from said carrier.

9. In a cigarette-machine, the combination of suitable means for depositing cigarettes at a point of delivery, an intermittently-advancing support upon which to mount a receptacle for said cigarettes, and an automatically-reversing step-by-step advancing mechanism moving said support first in one direction and then in the other to cause the cigarettes to be deposited in order and in layers; substantially as herein set forth.

10. In a cigarette-machine, the combination of the support for holding a receptacle beneath the point of delivery, a double ratchet mounted on said support and having its sliding and engaging faces on opposite sides of its middle line reversed in position, a dog for advancing said support through the medium of its ratchet, and means for shifting said dog from one side to the other of the ratchet as the support reaches the limits of its movement, as explained.

11. In a cigarette-machine, the combination of a support for holding a receptacle beneath the point of delivery, the ratchet mounted on said support, having its sliding and engaging faces reversed in position on opposite sides of the middle line of said ratchet, a dog coöperating with said ratchet and having means for moving it intermittently, a bell-crank lever having connection at one of its ends with said dog, and suitable projections on the support which engage the other end of said bell-crank lever to shift it, and through it the dog, as the support reaches the limits of its movement; substantially as herein set forth.

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