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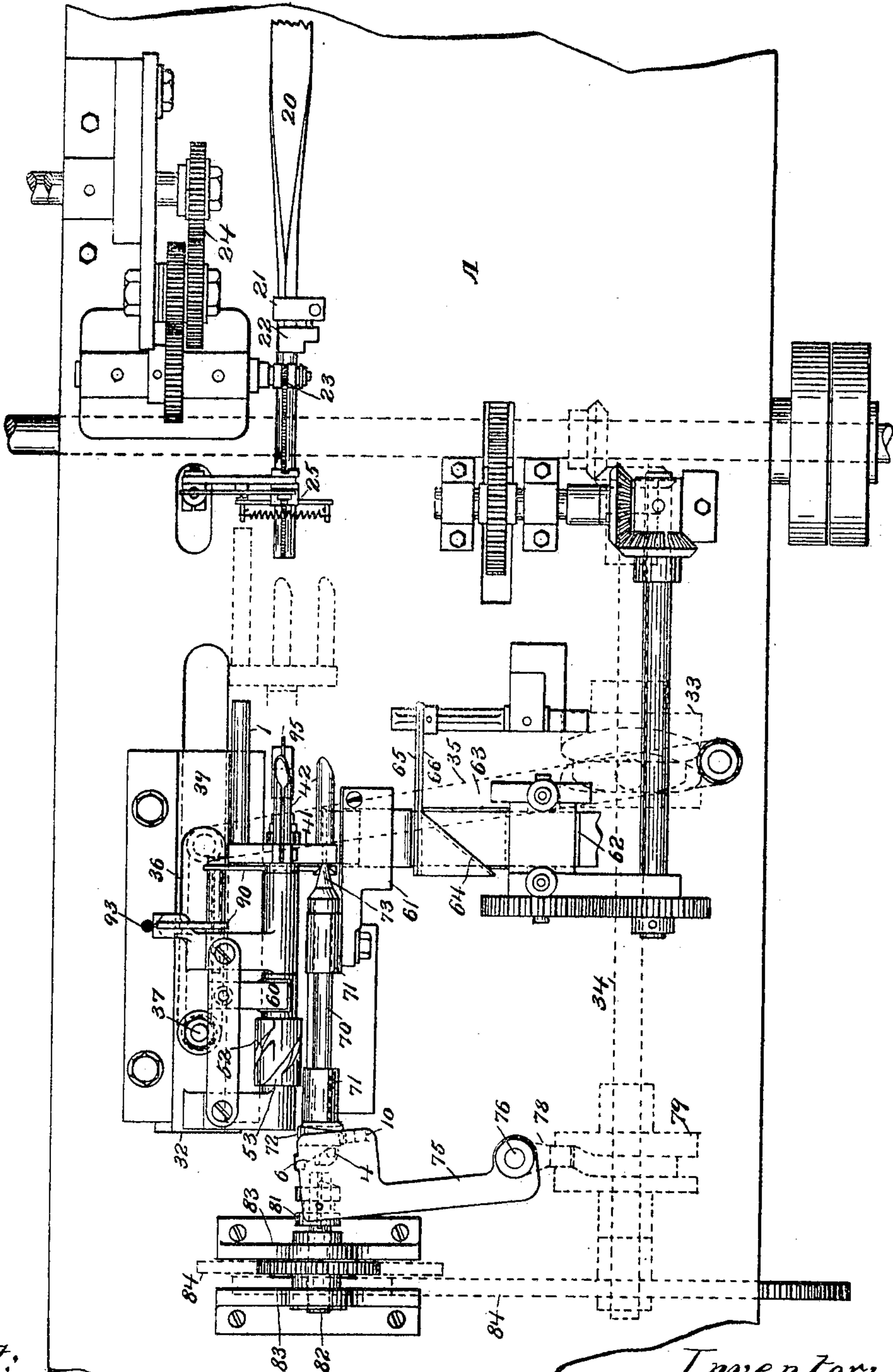
PATENTED SEPT. 12, 1905.

W. M. GRÜNZNER.
MECHANISM FOR FORMING AND INSERTING MOUTHPIECES IN CIGARETTE
TUBES.

APPLICATION FILED APR. 27, 1904.

4 SHEETS—SHEET 1.

Fig. 1.



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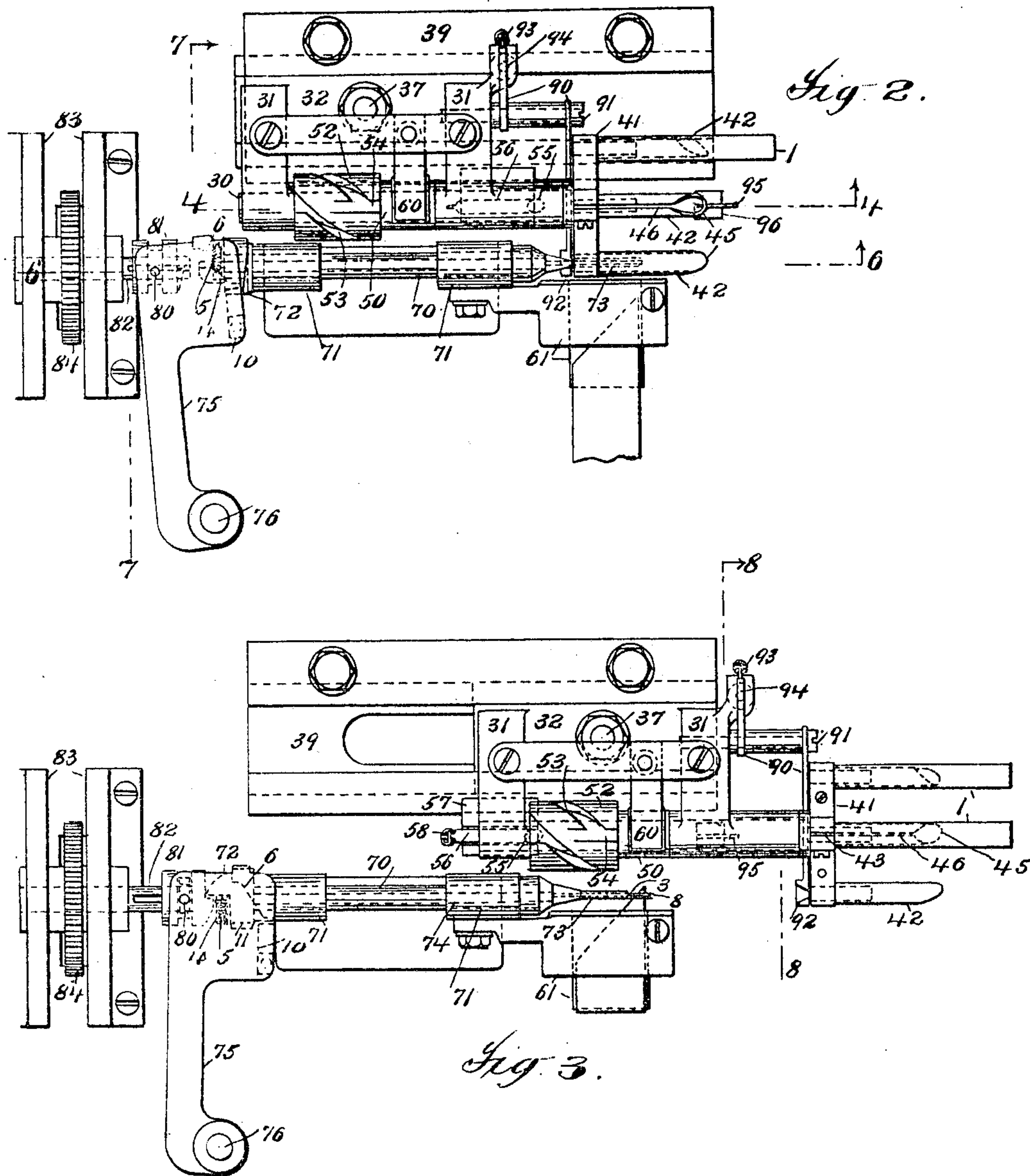
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4 SHEETS—SHEET 2.



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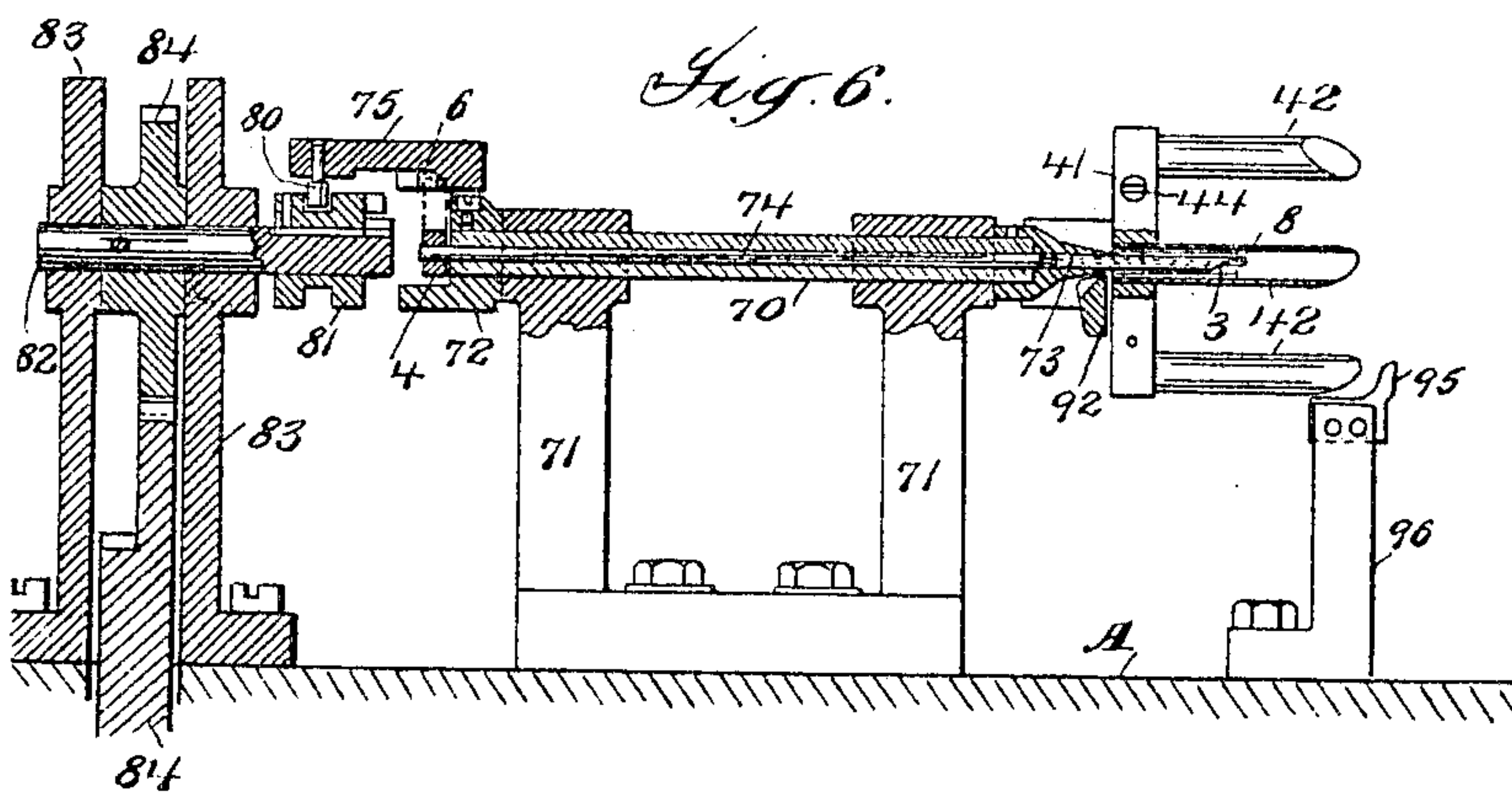
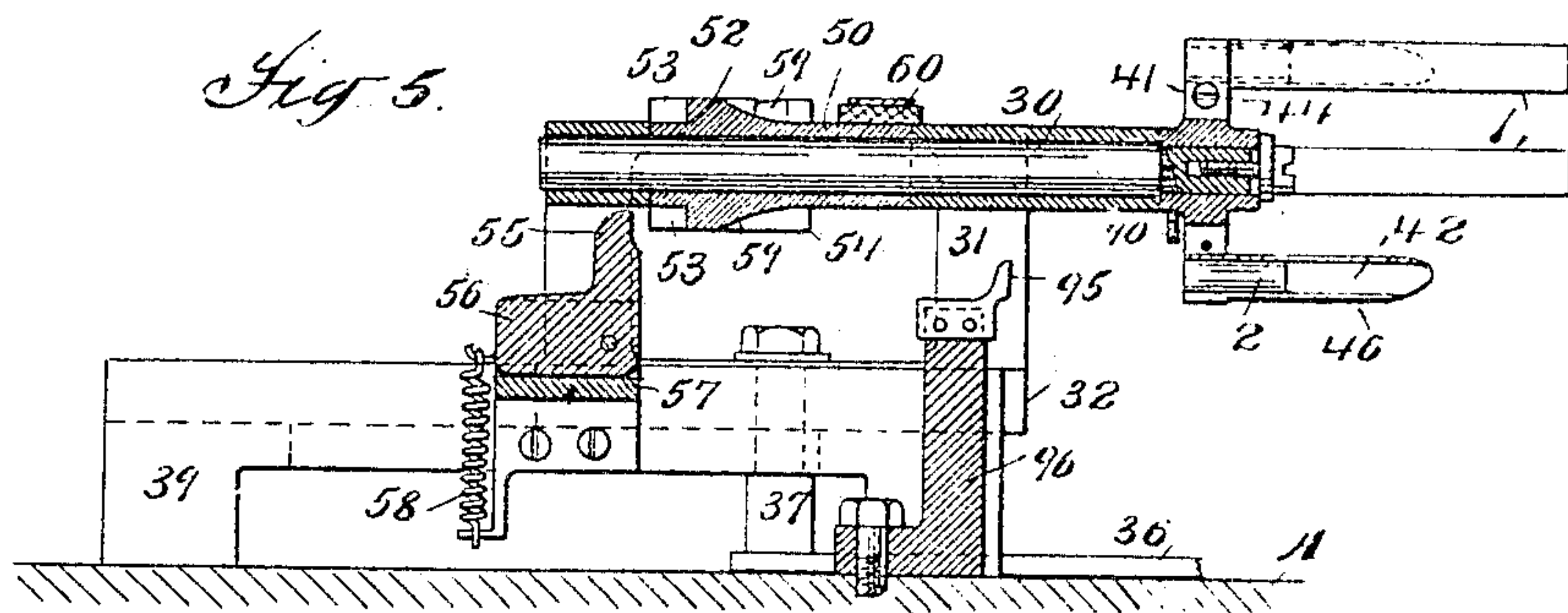
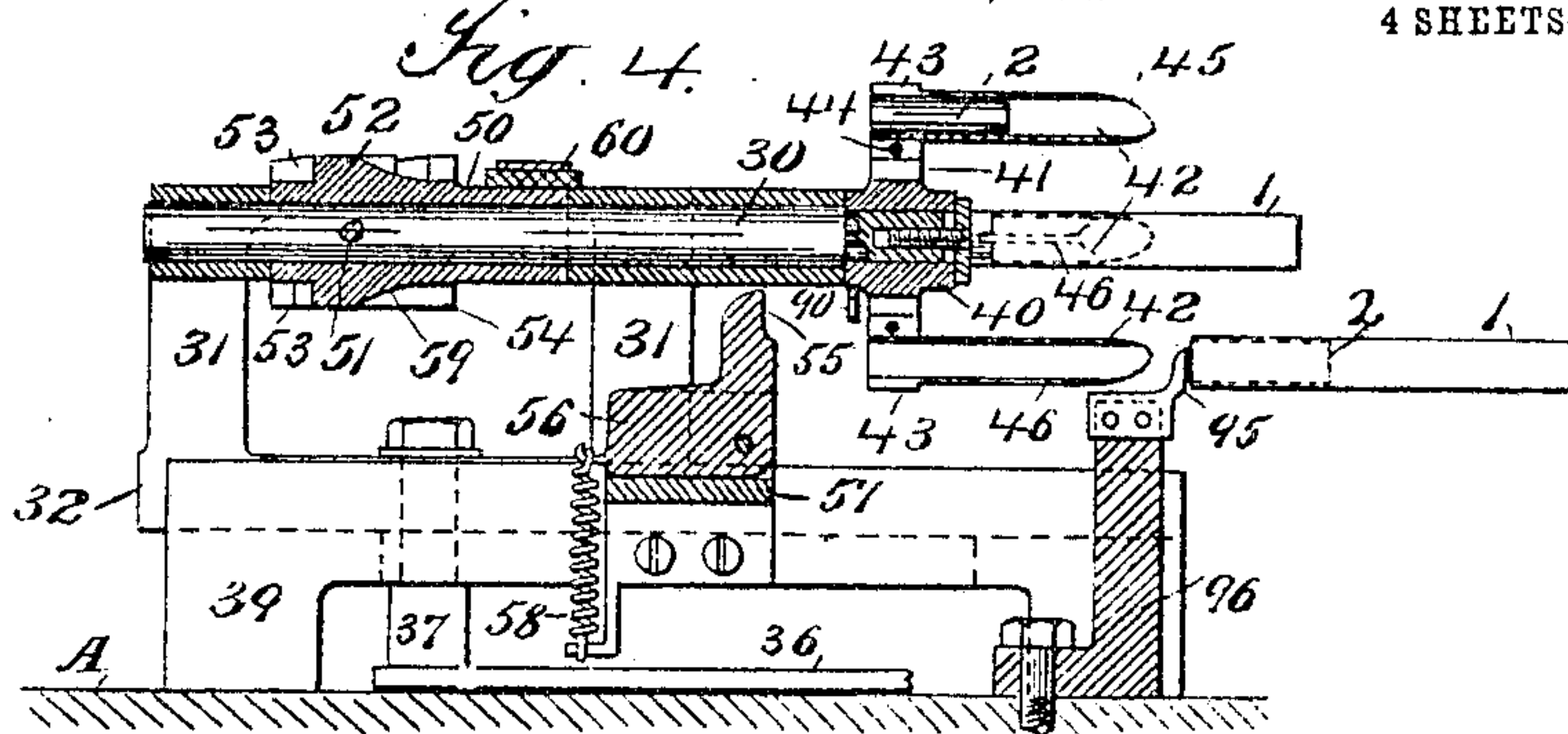
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4 SHEETS—SHEET 3.



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No. 799,046.

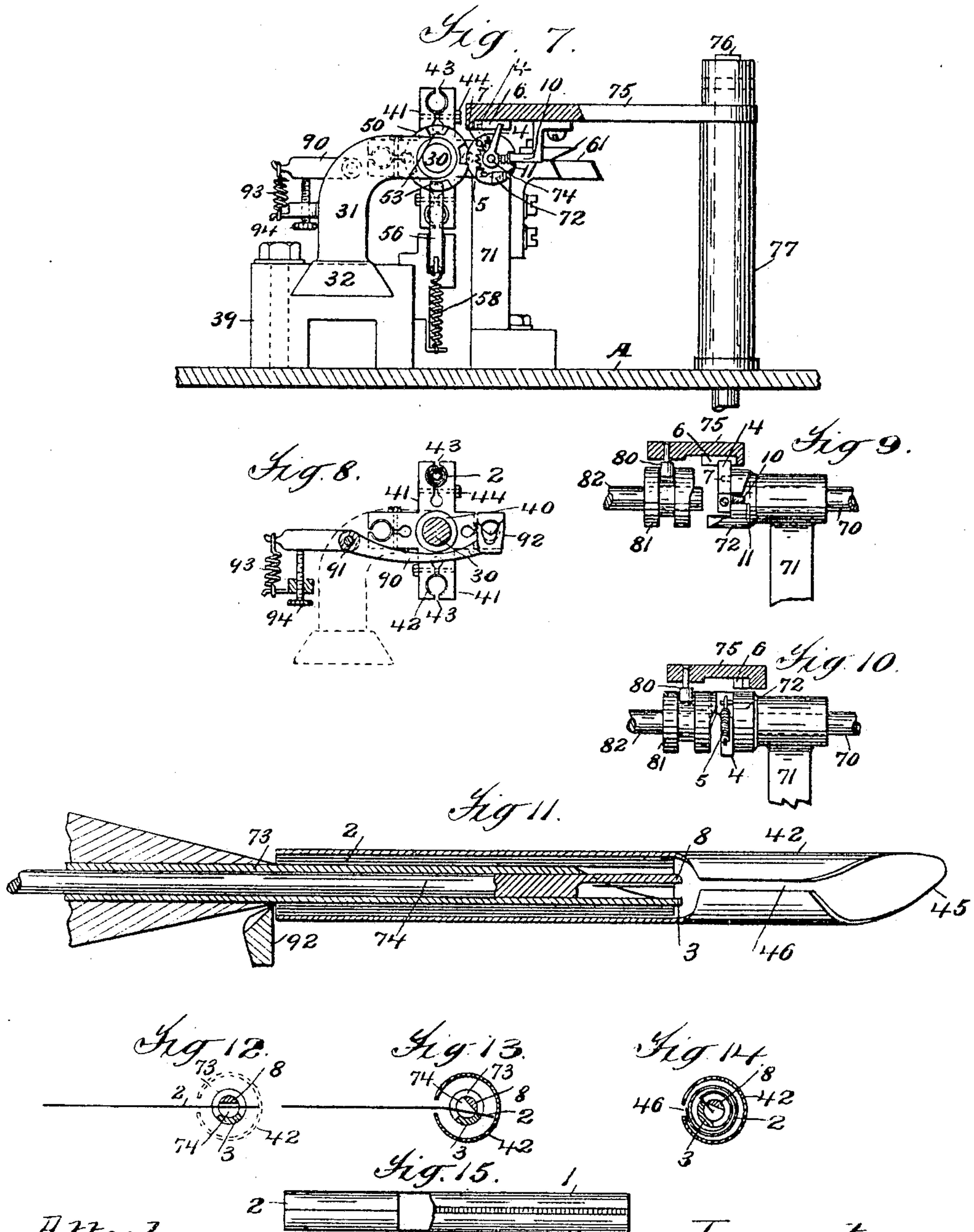
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4 SHEETS—SHEET 4.



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Inventor:

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UNITED STATES PATENT OFFICE.

WILHELM MAX GRÜNZNER, OF DRESDEN, GERMANY, ASSIGNOR TO THE
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MECHANISM FOR FORMING AND INSERTING MOUTHPIECES IN CIGARETTE-TUBES.

No. 799,046.

Specification of Letters Patent.

Patented Sept. 12, 1905.

Application filed April 27, 1904. Serial No. 205,136.

To all whom it may concern:

Be it known that I, WILHELM MAX GRÜNZNER, a subject of the King of Saxony, residing at Dresden, Saxony, Empire of Germany, have invented certain new and useful Improvements in Mechanism for Forming and Inserting Mouthpieces in Cigarette-Tubes, fully described and represented in the following specification and the accompanying drawings, forming part of the same, for which I have filed applications for Letters Patent as follows: Germany, Nos. J.7,427 III/79^b and J.7,428 III/79^b, filed July 15, 1903, and Russia, No. 21,566, filed July 30, 1903.

This invention relates to certain improvements in machines for forming mouthpieces and inserting them into cigarette-tubes, the especial object being to provide mechanism which will rapidly and efficiently form paper mouthpieces by rolling a strip of mouthpiece-paper, insert the mouthpieces into cigarette-tubes as the latter are delivered from a tube-making machine, and deliver the complete tubes with mouthpieces. In attaining this result I use a reciprocating carrier, on which are mounted a plurality of tubes, each of which is adapted to receive or have rolled therein a mouthpiece, and these tubes form molds for the mouthpieces, by which they are held in form during insertion into the cigarette-tubes, and this carrier is reciprocated toward and from the cigarette-tube cutting-off or other delivery mechanism, so that a mold on the carrier with mouthpiece therein receives a cigarette-tube as the latter is delivered and inserts the mouthpiece therein, the mold forming a support for the cigarette tube, by which the latter is withdrawn from the cigarette-tube-delivery mechanism in the backward movement of the carrier, and the completed cigarette-tube with mouthpiece therein is then delivered, preferably, by being stripped from the mold during the next backward movement. The carrier preferably has a step-by-step rotary movement, so as to transfer a mold or mouthpiece-tube from the position in which a mouthpiece is received to the position in which the mold enters the cigarette-tube as the carrier reciprocates and then to position for the backward or delivery movement of the carrier and mold, a machine of very high speed thus being provided for performing the different operations of inserting a

mouthpiece into the mold, inserting the mold and mouthpiece into the cigarette-tube, and delivering the completed tube with mouthpiece at different points in the rotary movement of the carrier.

The invention includes, in addition to the general features above stated, various features of construction and combinations of parts in mouthpiece forming and inserting mechanism, some of which are applicable in machines not employing a rotating and reciprocating carrier, but are of more general application and intended to be thus claimed.

For a full understanding of the invention a detailed description of a machine embodying all the features of the same in their preferred form will now be given in connection with the accompanying drawings, forming a part of this specification, and the features forming the invention will then be specifically pointed out in the claims.

In the drawings, Figure 1 is a plan view of so much of a machine for forming cigarette-tubes with mouthpieces as is necessary for an understanding of the invention. Fig. 2 is an enlarged plan view of a portion of Fig. 1, showing the mouthpiece-forming mechanism and cigarette-tube support and means for operating the same. Fig. 3 is a view similar to Fig. 2, showing the parts in another position. Fig. 4 is a section taken on the line 4 4 of Fig. 2. Fig. 5 is a view similar to Fig. 4, the parts being shown in the position indicated in Fig. 3. Fig. 6 is a section taken on the line 6 6 of Fig. 2. Fig. 7 is a sectional end view taken on the line 7 7 of Fig. 2. Fig. 8 is a section taken on the line 8 8 of Fig. 3. Fig. 9 is a detail view of the clutch. Fig. 10 is a similar view with the parts shown in a different position. Fig. 11 is a sectional detail, on an enlarged scale, showing the mouthpiece-winding core and a cigarette-tube support surrounding said core. Figs. 12, 13, and 14 are cross-sections of Fig. 11, showing the operation of the mouthpiece-winding mechanism; and Fig. 15 is a view of the cigarette-tube with mouthpiece inserted, the tube being partly broken away.

Referring to the drawings, A is a supporting-table of a machine for forming cigarette-tubes, which may be of any suitable form, the machine indicated being constructed to form a continuous tube from which the tube lengths

for forming the cigarettes are cut. The strip of paper 20 is bent around a mandrel by means of the guides 21 22, thence pass under a crimping or seaming wheel 23, which may be driven from any shaft of the machine by suitable gearing, as shown at 24, and the tube then fed to a cutting mechanism 25 of any suitable form, which serves the cigarette-tubes 1, which are to be provided with mouthpieces.

The machine is provided with means for making mouthpieces and inserting the mouthpieces in the cigarette-tubes. For this purpose the machine in the preferred embodiment of the invention illustrated in the drawings is provided with a number of tubes or molds mounted on a rotating and reciprocating carrier, so that a mouthpiece may be rolled up within one of the molds and the mold with the mouthpiece therein then brought into proper position by the rotary and reciprocating motion of the carrier and inserted into a cigarette-tube, the mold which receives the mouthpiece also forming a support for the cigarette-tube, by which the latter is received from the cutting mechanism, the cigarette-tube with the mouthpiece inserted therein being brought into proper position for delivery from the mold-tube by the movement of the carrier.

The mold-carrier in the form shown consists of a central longitudinal shaft 30, suitably mounted in bearings 31, carried by carriage 32, mounted to slide in a support 39, and which is moved toward and away from the cutting mechanism by any suitable means, the means shown being a cam 33, mounted on a shaft 34 of the machine and actuating a lever 35, having at its inner end a bowl engaging said cam and being connected at its outer end by a link 36 to a stud 37, secured to the slide 32, the stud running through an opening in the support 39. To the inner end of the shaft 30 is secured the carrier, consisting of a hub 40, supplied with carrier-arms 41, (four being shown,) in each of which a mold 42 is secured.

The outer ends of the carrier-arms 41 are slotted inwardly for a short distance, as shown at 43, (see Fig. 7,) these slots ending in openings to receive the molds 42, and the ends are then drawn together after the molds 42 are placed in the arms 41 by screws 44, thus supplying adjustable means for securing the molds 42 to the arms 41 in the proper position to receive the cigarette-tubes and the mouthpieces. The molds 42, as shown, have tapered ends 45 and are slotted longitudinally their entire length, as shown at 46, for a purpose hereinafter referred to; these slots 46 registering with the slots 43 of the arms 41.

The shaft 30 and carrier 40 are moved longitudinally by the carriage 32 and its operating connections, so as to receive the tube lengths from the cutting mechanism and insert the mouthpieces. The shaft 30 and carrier 40 also receive an intermittently-rotating

movement to bring one of the molds 42, which has previously received a mouthpiece, into a position to receive a tube length and also to bring another mold to a position to receive a mouthpiece, at the same time bringing the mold with the cigarette tube and mouthpiece assembled onto it into a position for stripping off the tube and mouthpiece.

The means for rotating the carrier is as follows: The shaft 30 is provided with a sleeve 50, secured to the shaft 30 by a pin 51 between the bearings 31. The sleeve 50 is enlarged in circumference at its outer end, as shown at 52, and has formed in it cam-grooves 53, beginning at the outer end of the sleeve and ending in a straight portion 54. These cam-grooves 53 are four in number, each cut one-fourth the circumference of the sleeve 50 and corresponding to the number of the carrier-arms 41. The cam-grooves 53 are engaged by a finger 55, forming a part of a block 56, pivoted to a bracket 57, extending from the carriage-support 39. The bracket 57 acts also as a back-stop for the block 56, which is held against the bracket by a spring 58, but which allows the finger to be rocked in the direction of movement of the carriage by the curved portions 59 of the grooves 54 as they strike the finger on the inward movement of the carriage.

When the shaft 30 and carrier 40 are moved inwardly from the position shown in Fig. 4 to the position shown in Fig. 5 to receive a cigarette-tube length, there will be no rotation of the sleeve 50 and shaft 30, but the finger 55 will be rocked inward against the pressure of spring 58, and after the cam hub or enlargement has passed it will spring back to the position shown in Fig. 5. Upon the shaft 30 and sleeve 50 being retracted the finger 55 will enter one of the cam-grooves 53 and rotate the sleeve one-fourth a revolution, bringing another mold into registration with the cutting mechanism and the other molds into position, one to receive a mouthpiece and one to have the cigarette tube and mouthpiece removed, the overthrow of the parts being prevented by a friction-pad 60, secured to the bearings 31.

The blank from which the mouthpiece is formed may be fed to the winding mechanism through suitable guides, as 61, in any suitable manner, and the blank, as shown in the drawings, is cut diagonally at its forward end to facilitate its engagement with the winding devices, and at its rear end is cut straight, so as to form a joint or seam corresponding to the seam of the cigarette-tube. As shown, this mechanism in its general features is similar to a well-known type of machine and consists of feed-rolls 62, which feed the strip of paper over a guide 63, one edge of which forms a cutting edge engaged by a knife 64 to cut the paper diagonally and knives 65 66 to cut the straight edge. These knives are

operated in a manner common to this class of machines.

The means for forming the mouthpiece will now be described. It consists of a hollow shaft 70, mounted in bearings 71, secured to the table A and having rigidly secured thereto at its outer end one member of a clutch 72 and at its inner end a winding-core formed of a hollow tube 73, cut away at its inner end to form a point 3. Within the hollow shaft 70 is provided a small shaft or rod 74, having fixed to its outer end an arm 4, the end of which is normally held by a spring 5 against the inclined surface 6 of an arm 75, secured to the upper end of a rock-shaft 76, mounted in a bearing 77, secured to the table A. The shaft 76 is provided at its lower end with an arm 78, having a roll which engages a cam-groove in a cam-disk 79, carried by the shaft 34. The end of the arm 75 opposite the shaft 76 is provided with a pin 80, which engages a groove in a clutch member 81, which is splined to move longitudinally on a short shaft 82, mounted in bearings 83, rising from the table A. The shaft 82 is continuously rotated by a train of gears 84, driven from the shaft 34.

The end of the core 73, as before mentioned, is cut away to form a point, and this cut-away portion is engaged by the end 8 of the rod 74, which is also cut away to allow the pointed end of the mouthpiece-blank to be inserted between them, as shown in Figs. 11 and 12. The rod 74 will then be given a partial rotation and the pointed end of the mouthpiece blank will be gripped and held between the ends 3 and 8, respectively, of the core 73 and rod 74. (See Fig. 13.) The core 73 and rod 74 will then be rotated together a number of revolutions in a direction opposite to that just given to the rod 74, winding the paper around the core 73, as shown in Fig. 14.

The means for giving the partial rotation to the rod 74 in one direction and a number of revolutions to the rod 74 and core 73 in another direction are as follows: When the pointed end of the mouthpiece-blank has been inserted between the ends 3 and 8 of the core 73 and rod 74, the arm 75 will be moved from the position shown in Figs. 2 and 9 to the position shown in Figs. 3 and 10. This movement of the arm 75 will throw the inclined part 6 of said arm 75 away from and out of the path of the arm 4, when the spring 5 will pull the arm 4 to the left against the stop 7 on the sleeve at the end of hollow shaft 70, as shown in dotted lines in Fig. 7, this movement of the arm 4 rocking the rod 74 to the position shown in Fig. 13.

The movement of the arm 75, just referred to, will at the same time move the driven clutch member 81 into engagement with the clutch member 72 and rotate the hollow shaft 70 and arm 73 and through the engagement of stop 7 with arm 4 will also move the rod 74 in a direction opposite to the partial rota-

tion previously given the rod 74, winding the paper about the core 73 and inside one of the molds 42, which is drawn over the core 73 before the mouthpiece is entirely formed on the winding-core 73. When the core 73 has been given a sufficient number of revolutions, the arm 75 will be moved back to unclutch the clutch members, and the member 72 will be locked in this position by an arm 10, secured to the under side of the arm 75, which engages a groove 11, formed in the clutch member 72, as shown in Fig. 7. This movement of the arm 75 will, through the incline 6 on said arm, throw the arm 4 to its normal position and release the pointed end of mouthpiece 2 from the ends 3 and 8, respectively, of the winding-core 73 and rod 74. As the molds 42 are moved forward and away from the winding-core, it is necessary that provision be made to strip the mouthpiece from the core 73, leaving it in the mold, so that at the proper time the mouthpiece may be inserted inside the cigarette-tube. To provide for this, a latch 90 is mounted in one of the supports 31, in which the mold-carrier 40 is mounted. The latch 90 is pivoted to said support at 91, the inner end 92 being pressed against the winding-core 73 by a spring 93, the latch being adjusted by an adjusting-screw 94. As the latch is mounted so as to move with the molds 42 as said molds are moved forward and away from the winding-core 73 the mouthpiece will be stripped from said core and remain in the mold by expansion against the inner side of said mold.

As previously described, the mold-carrier is rotated intermittently a quarter of a revolution at a step, first, to bring a mold into position to receive a mouthpiece, then a step to position to receive a cigarette-tube, and then two steps to the position from which the cigarette-tube with mouthpiece is delivered, preferably to a suitable rerolling mechanism. (Not shown.) When the carrier 40 is in the position shown in Fig. 5, it is about to be retracted and given a one-quarter turn by the finger 55 and cam-collar 50, as before referred to. This is done at the beginning of the backward movement of the carrier and brings the mold carrying a mouthpiece and cigarette-tube in line with a stationary stripping-finger 95, mounted on a bracket 96, secured to the table A. This finger 95 is made thin and adapted to pass through the slot 46, formed in the tube-supports 42. The mouthpiece when in the mold necessarily projects beyond the end of the cigarette-tube on the mold the thickness of the mold-carrier arm 41. As the carrier 40 is moved back-carrying the mouthpiece and cigarette-tube, the finger will first engage the mouthpiece and push it forward into the cigarette-tube until the finger 95 engages the cigarette-tube, when both will be forced off the mold, as shown in Fig. 4. Thus for each reciprocation of the mold-car-

rier one of the molds receives a mouthpiece, one inserts a mouthpiece into a cigarette-tube, and one delivers a complete tube with mouthpiece.

5 It will be seen that in the machine illustrated and above described the desirable result of covering the edge of the mouthpiece by the seam of the cigarette-tube is assured. This is attained by rolling the mouthpiece so
10 that the end of the mouthpiece is always placed directly below the longitudinal slot in the mold through which the mouthpiece enters the mold and positioning this slot so that it is directly in line with the seam of the cigarette-tube as the latter is delivered. Neither
15 the mouthpiece nor the cigarette-tube can be accidentally displaced, and thus the registering of the mouthpiece edge and the tube-seam is assured under all circumstances. While I
20 have aimed to produce a satisfactory machine securing this result, my improved mechanism may obviously be used for inserting mouthpieces without the edge of the mouthpiece registering with the seam of the cigarette-tube.
25

It will be understood that the invention is not to be limited to the mechanism shown, which is illustrated as the preferred embodiment of the invention, but that the form and
30 arrangement of the parts may be widely varied, while retaining the features of the invention as defined by the claims. It will be understood also that while my tube forming and inserting mechanism is especially intended
35 for inserting mouthpieces into cigarette-tubes as they pass from a tube-forming machine this mechanism may be used also as an independent machine for inserting mouthpieces into previously-formed cigarette-tubes presented to it by any suitable devices.
40

What I claim is—

1. In mouthpiece forming and inserting mechanism, the combination with a longitudinally-movable mold, of means for inserting
45 a mouthpiece therein, means for advancing the mold and mouthpiece into a cigarette-tube, means for returning the mold with the cigarette-tube and mouthpiece thereon, and means for delivering the cigarette-tube with
50 mouthpiece from the mold during the return movement.

2. In mouthpiece forming and inserting mechanism, the combination with a plurality of molds, of a carrier for said molds, means
55 for inserting mouthpieces into the molds, means for advancing the carrier to insert a mold and mouthpiece into a cigarette-tube, means for actuating the carrier to move the mold sidewise, and means for delivering the
60 cigarette-tube and mouthpiece from the mold.

3. In mouthpiece forming and inserting mechanism, the combination with a plurality of molds, of a carrier for said molds, means for inserting mouthpieces into the molds,
65 means for advancing the carrier to insert a

mold and mouthpiece into a cigarette-tube, means for rotating the carrier to move the mold sidewise, and means for delivering the cigarette-tube and mouthpiece from the mold.

4. In mouthpiece forming and inserting
70 mechanism, the combination with a plurality of molds, of a reciprocating and rotating carrier for said molds, means for rolling a mouthpiece within a mold in one position of the carrier, means for actuating the carrier to insert
75 the mold and mouthpiece into a cigarette-tube, means for rotating the carrier to move the mold into delivery position, and means for withdrawing the carrier with the mold and cigarette-tube thereon and delivering the cigarette-tube with mouthpiece.
80

5. In mouthpiece forming and inserting mechanism, the combination with a plurality of molds, of a reciprocating and rotating carrier for said molds, means for rolling a mouthpiece within a mold in one position of the carrier, means for rotating the carrier and advancing it to insert the mold and mouthpiece into a cigarette-tube, means for rotating the carrier to move the mold into delivery position, means for withdrawing the carrier with the mold and cigarette-tube thereon, and a stripper for removing the cigarette-tube with mouthpiece from the mold in the backward movement of the carrier.
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6. The combination with means for forming a cigarette-tube and delivering it endwise, of a plurality of molds, a reciprocating and rotating carrier for said molds, means for rolling a mouthpiece within a mold in one position of the carrier, means for actuating the carrier to insert the mold and mouthpiece into a cigarette-tube as it is delivered, and means for withdrawing the carrier with the mold and cigarette-tube thereon and delivering the cigarette-tube with mouthpiece.
100
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7. The combination with means for forming a cigarette-tube and delivering it endwise, of a plurality of molds, a reciprocating and rotating carrier for said molds, means for rolling a mouthpiece within a mold in one position of the carrier, means for rotating and advancing the carrier to insert the mold and mouthpiece into a cigarette-tube as it is delivered, means for rotating the carrier to move the mold into delivery position, and a stripper for removing the cigarette-tube with mouthpiece from the mold in the backward movement of the carrier.
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8. The combination with the slotted tubes 42, of the reciprocating carrier 40, hub 52 on said carrier having the cam-slots 53, and pivoted finger 55 for rotating the carrier.
120

9. The combination with the slotted tubes 42, of the reciprocating carrier 40, hub 52 on said carrier having the slots 53, pivoted finger 55 for rotating the carrier, and stripping-finger 95.
125

10. The combination with the slotted tubes 42, of the reciprocating carrier 40, hub 52 on
130

said carrier having the slots 53, pivoted finger 55 for rotating the carrier, means for rolling up mouthpieces within the tubes, latch 92 for stripping the mouthpiece from the rolling up means, and stripper 95 for removing the mouthpiece from the tube.

11. The combination with the slotted tube 42, of the winding-core 73 having the point 3, rod 74 within the core having the point 8, means for rotating the rod in one direction to grip the mouthpiece-blank, and means for rotating the core and rod in the opposite direction to roll the mouthpiece.

12. The combination with the core 73 having the point 3, of the rod 74 having the point 8 and arm 4, a cam coacting with the arm for rotating the rod to grip the mouthpiece-blank, and means for rotating the core and rod in the opposite direction to roll the mouthpiece.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILHELM MAX GRÜNZNER.

Witnesses:

GEORG KNOCHE,
JAMES F. MATHIAS.